The Status of Chum Salmon Stocks of the West Coast of Vancouver Island, 1951-1982, Statistical Areas 22-27

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by

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CONTENTS

	Page
List of Figures	iv
List of Tables	vi
List of Appendices	ix
Abstract/Résumé	xi
Introduction	1
Area 22 (Nitinat Lake)	4
Catches, escapements and rates of return	4
Test fishing	11
Fish quality study in Areas 21 and 22, 1981	11
Nitinat hatchery	14
Area 23 (Barkley Sound)	14
Catches, escapements and rates of return	14
Test fishing	18
Thornton Creek hatchery	26
Ucluelet Harbour gillnet fisheries	26
Area 24 (Clayoquot Sound)	26
Catches, escapements and rates of return	26
Test fishing	31
Area 25 (Nootka Sound)	31
Catches, escapements and rates of return	31
Test fishing	44
Tlupana Inlet enhancement facility	44
Area 26 (Kyuquot Sound)	44
Catches, escapements and rates of return	44
Test fishing	51
Area 27 (Quatsino Sound)	51
Catches, escapements and rates of return	51
Test fishing	60
Summary and discussion of basic stock data, Areas 22-27	60
Migration timing of chum stocks	60
Timing and effort of chum net fisheries	68
Catches	68
Total stock estimates	73
Rates of return	73

Page

Incubation and early estuarine and marine rearing..... 73
High seas survival 79
Exploitation by net fisheries..... 79
Age composition 79

Discussion of management problems..... 84
Forecasting returns..... 84
Optimizing commercial value..... 88

Acknowledgements 89

References 90

Appendices 91

LIST OF FIGURES

Figure

1. Location of Statistical Areas in southern British Columbia 2
2. Annual catch and escapement estimates for chum salmon in Area 22, 1951-1983 5
3. Location of salmon spawning streams in Areas 22 and 23 7
4. Relationship between total returns and spawning escapements for chum salmon in Area 22, 1968-1977 brood years 10
5. Weekly mean catch per hour set in Area 22 chum test fishery, 1978-1981 12
6. Annual catch and escapement estimates for chum salmon in Area 23, 1951-1983 16
7. Relationship between total returns and spawning escapements for chum salmon in Area 23, 1966-1977 brood years 22
8. Weekly mean catch per hour set in Area 23 chum test fishery, 1977-1982 23
9. Annual catch and escapement estimates for chum salmon in Area 24, 1951-1983 28
10. Location of salmon spawning streams in Area 24 30

Figure		Page
11.	Relationship between total returns and spawning escapements for Area 24 chum salmon, 1971-1977 brood years	34
12.	Weekly mean catch per hour set in Area 24 chum test fishery, 1977-1980	34
13.	Annual catch and escapement estimates for chum salmon in Area 25, 1951-1983	37
14.	Location of salmon spawning streams in Area 25	39
15.	Relationship between total returns and spawning escapements for chum salmon in Area 25, 1956-1977 brood years	43
16.	Weekly mean catch per hour set in Area 25 chum test fishery, 1977-1980	45
17.	Annual catch and escapement estimates for chum salmon in Area 26, 1951-1983	49
18.	Location of salmon spawning streams in Area 26	52
19.	Relationship between total returns and spawning escapements for chum salmon in Area 26, 1972-1977 brood years	56
20.	Weekly mean catch per hour set in Area 26 chum test fishery, 1977-1980	56
21.	Annual catch and escapement estimates for chum salmon in Area 27, 1951-1983	58
22.	Location of salmon spawning streams in Area 27	61
23.	Relationship between total returns and spawning escapements for chum salmon in Area 27, 1974-1977 brood years	64
24.	Weekly mean catch per hour set in Area 27 chum test fishery, 1977-1980	64
25.	Mean spawning timing of major WCVI chum salmon stocks in Areas 22-27, 1970-1982 data	67
26.	Weekly net catches of chum salmon in Area 22-27, 1970-1982	69
27.	Annual catch and escapement estimates for chum salmon in combined Areas 22-27, 1951-1982	71
28.	Annual net catches of chum salmon in Areas 22-27, expressed as percent of WCVI total chum net catch, 1951-1982	72

Figure		Page
29.	Annual stock estimates of chum salmon in Areas 22-27, expressed as percent of WCVI total chum stock, 1951-1982	75
30.	Rates of return of chum salmon in individual and combined Areas 22-27, Johnstone Strait and Puget Sound, 1966-1977	76
31.	Relationship between total returns and spawning escapements for WCVI chum salmon, 1968-1977 brood years	80
32.	Percent exploitation of chum salmon in the net fisheries in Areas 22-27, 1951-1982	81
33.	Percent of total return at ages 3, 4 and 5 for WCVI chum salmon in Areas 22-27, 1967-1977 broods	83
34.	Percent return at age 3 related to corresponding brood escapement for WCVI chum stocks, 1967-1977 brood years	85
35.	Percent return at age 3 for WCVI, Johnstone Strait and Puget Sound chum stocks, 1968-1977 brood years	85

LIST OF TABLES

Table		
1.	Annual catch, escapement and total stock estimates for chum salmon in Area 22, 1951-1983	6
2.	Age breakdown of chum salmon catches in Area 22, 1971-1982	8
3.	Age breakdown of chum salmon escapements in Area 22, 1971-1982	8
4.	Brood year summaries and rates of return for chum salmon in Area 22, 1968-1979	9
5.	Weekly mean catch per hour set in Area 22 chum test fishery, 1978-1981	13
6.	Quality comparison of chum salmon caught in Area 21 and 22 test fisheries, 1981	13
7.	Nitinat chum hatchery production, 1980-1982 broods	15

Table		Page
8.	Predicted annual returns of Nitinat hatchery chum salmon from 1980-1982 broods	15
9.	Annual catch, escapement and total stock estimates for chum salmon in Area 23, 1951-1983	17
10.	Escapement levels for major chum producing streams in Area 23	19
11.	Age breakdown of chum salmon catches in Area 23, 1959-1982	19
12.	Age breakdown of chum salmon escapements in Area 23, 1959-1982	20
13.	Brood year summaries and rates of return for chum salmon in Area 23, 1956-1979	21
14.	Weekly mean catch per hour set in Area 23 chum test fishery, 1977-1982	24
15.	Mean catch per hour in Area 23 chum test fishery related to total chum stock in that area, 1977-1980	25
16.	Thornton Creek chum hatchery production, 1976-1982 broods	27
17.	Predicted and actual annual returns of Thornton Creek hatchery chum salmon from 1976-1982 broods	27
18.	Annual catch, escapement and total stock estimates for chum salmon in Area 24, 1951-1983	29
19.	Escapement levels for major chum producing streams in Area 24	30
20.	Age breakdown of chum salmon catches in Area 24, 1974-1982	32
21.	Age breakdown of chum salmon escapements in Area 24, 1974-1982	32
22.	Brood year summaries and rates of return for chum salmon in Area 24, 1971-1979	33
23.	Weekly mean catch per hour set in Area 24 chum test fishery, 1977-1980	35
24.	Mean catch per hour in Area 24 chum test fishery related to total chum stock in that area, 1977-1980	36
25.	Annual catch, escapement and total stock estimates for chum salmon in Area 25, 1951-1983	38
26.	Escapement levels for major chum producing streams in Area 25	40

Table		Page
27.	Age breakdown of chum salmon catches in Area 25, 1959-1982	40
28.	Age breakdown of chum salmon escapements in Area 25, 1959-1982	41
29.	Brood year summaries and rates of return for chum salmon in Area 25, 1956-1979	42
30.	Weekly mean catch per hour set in Area 25 chum test fishery, 1977-1980	46
31.	Mean catch per hour in Area 25 chum test fishery related to total chum stock in that area, 1977-1980	47
32.	Tlupana Inlet chum hatchery production, 1978-1982 broods	48
33.	Predicted annual returns of Tlupana Inlet hatchery chum salmon from 1978-1982 broods	48
34.	Annual catch, escapement and total stock estimates for chum salmon in Area 26, 1951-1983	50
35.	Escapement levels for major chum producing streams in Area 26	52
36.	Age breakdown of chum salmon catches in Area 26, 1959-1982	53
37.	Age breakdown of chum salmon escapements in Area 26, 1959-1982	54
38.	Brood year summaries and rates of return for chum salmon in Area 26, 1956-1979	55
39.	Weekly mean catch per hour set in Area 26 chum test fishery, 1977-1980	57
40.	Mean catch per hour in Area 26 chum test fishery related to total chum stock in that area, 1977-1979	57
41.	Annual catch, escapement and total stock estimates for chum salmon in Area 27, 1951-1983	59
42.	Escapement levels for major chum producing streams in Area 27	62
43.	Age breakdown of chum salmon escapements in Area 27, 1977-1982	62
44.	Brood year summaries and rates of return for chum salmon in Area 27, 1974-1979	63
45.	Weekly mean catch per hour set in Area 27 chum test fishery, 1977-1980	65

Table		Page
46.	Mean catch per hour in Area 27 chum test fishery related to total chum stock in that area, 1977-1980	66
47.	Annual chum salmon catches in Areas 22-27, expressed as percent of WCVI total catch, 1951-1982	70
48.	Annual chum salmon stock estimates for Areas 22-27, expressed as percent of WCVI total stock, 1951-1982	74
49.	Chum rates of return for individual Areas 22-27, total WCVI, Johnstone Strait and Puget Sound, 1966-1977	77
50.	Total returns at ages 3, 4 and 5 and rates of return for WCVI chum stocks, 1967-1977 broods	78
51.	Annual percent exploitation of chum salmon in the net fisheries in Statistical Areas 22-27, 1951-1982	82
52.	Percent total return at age 3 for WCVI, Johnstone Strait and Puget Sound chum stocks, 1968-1977 broods	86
53.	Chum escapement estimates for six WCVI streams using two different methods of evaluation	87
54.	Comparison of commercial value of bright and dark chum salmon, 1979-1982	87

LIST OF APPENDICES

Appendix		
1a.	WCVI troll catches of chum salmon, 1970-1982	91
1b.	WCVI Indian Food Fishery catches of chum salmon, 1958-1982	91
2.	Annual chum salmon escapements to individual streams in Areas 22 to 27, 1947-1982	92
3.	Age composition of WCVI chum stocks in Areas 22 to 27, 1959-1982	111
4.	WCVI chum salmon test fisheries in Areas 22 to 27, 1977-1982	118
5.	Chum salmon fish quality study in Areas 21 and 22, 1981	120
6.	Spawning timing of chum stocks in major WCVI streams, Areas 22-27	125

Appendix		Page
7.	Weekly gillnet and seine catches of chum salmon in Statistical Areas 22-27, 1970-1982	126
8.	Summary of net fishing effort and catch directed at chum salmon in Statistical Areas 22-27, 1970-1982	139
9.	Percent of total return at ages 3, 4 and 5 for WCVI chum salmon in Areas 22 to 27, 1967-1977 broods	143
10.	Chum fecundity study from test fishery samples in Areas 22 to 27, 1977	145

ABSTRACT

Lightly, D.T., M.J. Wood and S.R. Heizer. 1985. The status of chum salmon stocks of the west coast of Vancouver Island, 1951-1982, statistical areas 22-27. Can. Tech. Rep. Fish. Aquat. Sci. 1366: 150 p.

The catch, escapement, rates of return, fishery exploitation rates and available age composition data for the west coast of Vancouver Island chum salmon are presented for the period 1951 to 1982. Also included are results of test fisheries conducted during 1977 to 1982, and net fishing effort during 1970 to 1982. Fishery management problems, particularly those regarding forecasting returns and optimizing commercial catch value, are discussed.

Key words: west coast of Vancouver Island chum salmon, catch, escapement, rates of return, exploitation, test fisheries, enhancement, fishery management.

RÉSUMÉ

Lightly, D.T., M.J. Wood and S.R. Heizer. 1985. The status of chum salmon stocks of the west coast of Vancouver Island, 1951-1982, statistical areas 22-27. Can. Tech. Rep. Fish. Aquat. Sci. 1366: 150 p.

On présente, pour la période de 1951 à 1982, les données sur les prises, la remonte, les taux de retour et les taux d'exploitation liés à la pêche ainsi que les données disponibles sur la composition par âge en ce qui concerne le saumon kéta de la côte ouest de l'Île Vancouver. Ce rapport renferme également les résultats de pêche d'essai réalisées entre 1977 et 1982 et de l'effort de pêche du saumon au filet entre 1970 et 1982. On discute ensuite des problèmes relatifs à la gestion des pêches, en particulier de ceux ayant trait à la prévision des retours et à l'optimisation de la valeur commerciale des prises.

Mots-clés: saumon kéta de la côte ouest de l'Île Vancouver, prises, remonte, taux de retour, exploitation, pêche d'essai, mise en valeur, gestion de la pêche.

INTRODUCTION

The main purpose of this report is to present the 1951 to 1982 catch and escapement estimates for the WCVI chum salmon in Statistical Areas 22 to 27 (Fig. 1), as well as the available age composition data, and to examine the factors affecting these parameters. Also included are results of gillnet and seine test fisheries conducted from 1977 to 1982, and production summaries with projected adult returns for the WCVI enhancement facilities. Results of the 1977 chum fecundity study are given at the end of the report (Appendix 10). Data for each Statistical Area are presented in separate sections, while conclusions and recommendations for managing the WCVI chum fishery are included with the discussion.

In this report, emphasis was placed on results from 1970 to 1982 as a previous report (Roberts 1970) dealt with data up to 1969. Some overlap occurred with the Roberts (1970) report in order to maintain data continuity and complete the brood returns using catch and escapement data after 1969.

The chum salmon of the west coast of Vancouver Island (WCVI) have supported valuable fisheries since before the turn of the century. Catches in these fisheries have ranged from well over two million pieces in peak years to relatively insignificant numbers taken in the Indian Food Fisheries during the less productive periods.

The majority of chum salmon caught on the west coast of Vancouver Island are taken during September and October by seines and gillnets. Fisheries take place inside the surfline of each Statistical Area (Fig. 1) in order to minimize the harvesting of stocks originating outside the area. Brooks Bay (Area 27) is an exception in that the position of the surfline allows net fishing in relatively exposed waters. This zone is probably a landfall area for salmon travelling down the west coast of Vancouver Island and interception of fish from outside Area 27 may have occurred prior to 1961. Since that time, no significant chum fisheries have occurred in Area 27.

Troll catches of chum salmon on the west coast of Vancouver Island are made from May to October, with the peak usually occurring in the first week of August. Since the returning fish enter Areas 22 to 27 primarily in mid-September, the impact of the troll fishery on the WCVI chum stocks is considered to be small. Troll catches are taken almost entirely outside the surfline and undoubtedly consist of mixed stocks. The WCVI chum catches from troll fishery and Indian Food Fishery are shown in Appendix 1.

At present it is not possible to estimate the numbers of chum from each area that are caught outside the surfline. Therefore in this report, the total stock for each area is represented by the net fishery catches plus escapement estimates. Escapement estimates were taken from fishery officers' stream reports and were based on visual observations during foot surveys, and boat and aerial surveys.

Roberts (1970) described the history of the west coast of Vancouver Island fishery up to 1969. Prior to the 1950's, the WCVI chum fisheries were generally open each year as a matter of course, with closures implemented only when catches indicated disastrously low stocks. During the 1950's, this "open if not closed" approach to the fishery changed to one of "closed if not open" and by 1965, Areas 22 to 27 were closed to all net fishing during the fall. This total

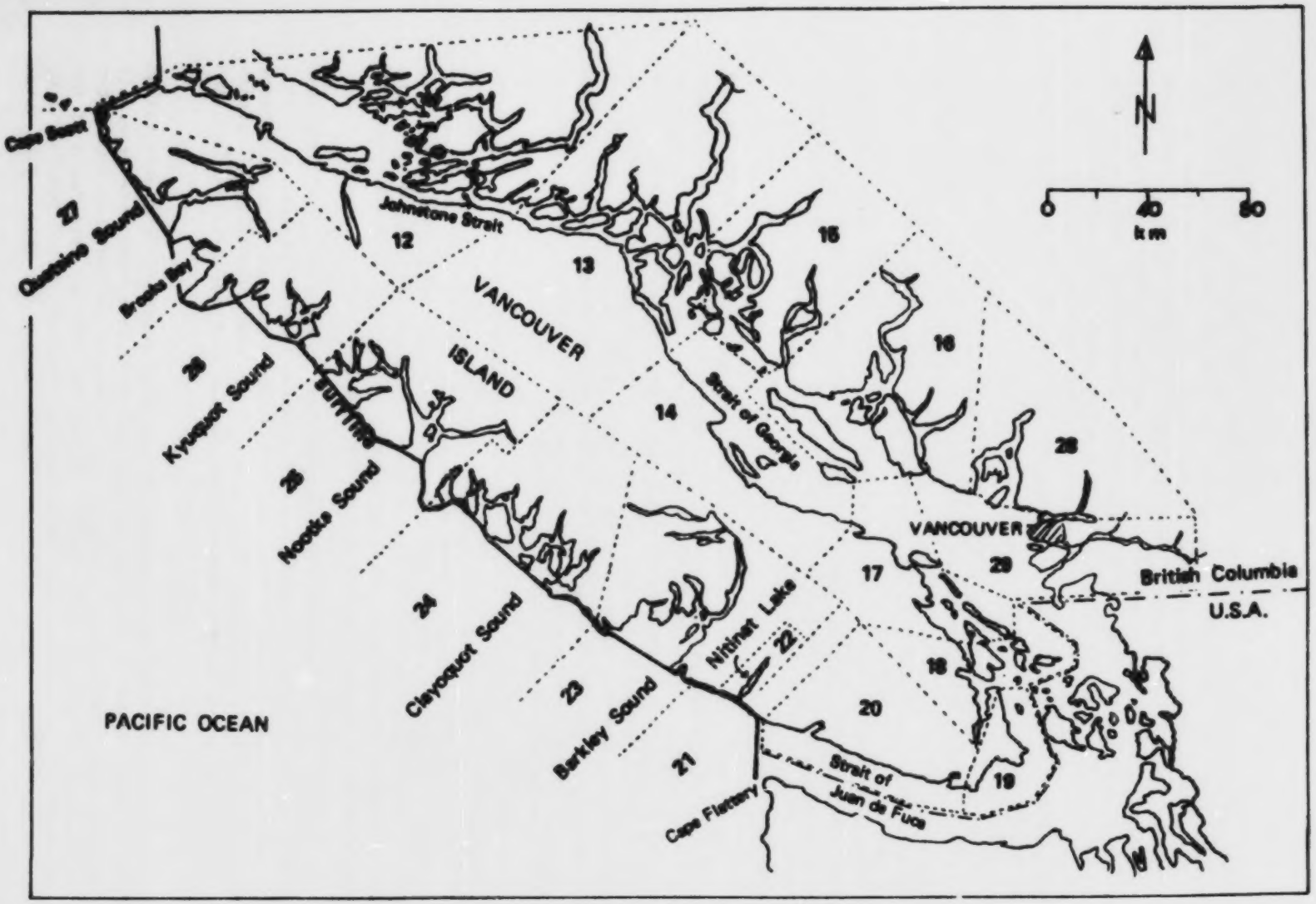


Fig. 1. Location of Statistical Areas in southern British Columbia.

closure continued until 1969 when specific areas began to open depending on the stock strength. During the 1970's, the fisheries have occurred sporadically and extreme fluctuations in stock strength have made management of the WCVI chum fishery difficult.

The migration pattern followed by chum salmon returning to the inlets of the west coast of Vancouver Island makes it almost impossible for a fishery to be delayed until an adequate escapement has entered the streams. The fish tend to mill in the inlets until they approach sexual maturity, with the attendant loss of commercial value, then enter the streams within a short period, usually occurring with the onset of high water at the end of September and early October (see section on migration timing). This pattern makes an early estimate of stock strength crucial to the management of these stocks.

Until recently, attempts to predict the strength of returning stocks were based on average rates of return and age composition data applied to the escapements for the principal brood years. This method was totally unsatisfactory since the age composition and rate of return for any particular brood year have varied widely. Although predictions were made annually and published in the salmon expectation bulletins, they were generally regarded to be of limited value.

In practice, the decisions to open fisheries were made on the basis of visual observations, catches in commercial and Indian Food Fisheries, or in a few cases, on results from test fisheries. The visual observations were done from the water or from aircraft and their value depended entirely on the experience of the observer and on conditions at the time of observation. The Indian Food Fisheries tended to occur at river mouths and were of little value for early estimation of stock strength. The early test fisheries were very limited and lack of background data, such as fish age composition, reduced their usefulness.

When the chum salmon fisheries resumed on a limited basis during the late 1960's, an occasional practice was to open an area during the first or second week of September and use the catches as an indicator of stock strength. This approach was useful when the fishing effort remained low but lost its value in recent years due to increased fleet size, mobility and efficiency. Any fishery opening tends to be well attended and, even early in the run, significant overfishing of small returns can occur.

In 1977, a regular gillnet test fishing program was implemented on the WCVI chum stocks. The purpose of these test fisheries was to gather reliable age data from which estimates of returns from individual brood years could be made, and to determine if gillnet catches could be used as indicators of stock strength. In 1982, seine test fisheries were conducted in Areas 24, 25 and 26 in order to determine if the stock abundance in these areas was sufficient to support a commercial fishery.

The other factor considered in the management of the WCVI chum stocks was the optimum escapement required for the streams in each area. The numbers used were based on the estimated spawning capacity for all the streams in the area. These estimates have evolved over the years in conjunction with the escapement surveys and were not based on any physical measurement of the extent and quality of the spawning gravel in the stream segments utilized by chum salmon.

The rate of return for any stock of chum salmon is determined by conditions encountered during spawning, incubation, estuarial and inshore rearing, and ocean rearing. However, factors affecting chum survival beyond the freshwater life stage have not yet been isolated and quantified, and the management of these stocks will remain a problem until more data are available on all phases of the chum life cycle.

AREA 22 (NITINAT LAKE)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 22 chum salmon for the period 1951 to 1983 are shown in Figure 2 and Table 1. The chum stocks in Area 22 have been fished in 11 of the above 33 years, with limited fisheries occurring after the 1950's. Total area escapements between 1951 and 1983 have ranged from 4,500 in 1979 to 264,600 in 1972. The estimated optimum escapement for the area, based on the approximate spawning capacity of streams flowing into Nitinat Lake, is 125,000 chum. The validity of this figure is supported by the huge 1972 catch of 1.3 million chum resulting from the 1968 brood of approximately 125,000 fish. This escapement goal has been realized only four times during the 1951 to 1983 period and escapements have exceeded 50,000 fish on only nine occasions. While environmental conditions have obviously played an important role in determining stock size, the serious overfishing occurring between 1951 and 1960 was also a contributing factor.

According to many experienced fishermen, chum salmon are generally among the most difficult fish to catch, partly due to their habit of sounding beneath the nets. However, chum in Nitinat Lake are extremely vulnerable to nets because this method of escape is denied to them by the presence of hydrogen sulfide in the lake below 10 m to 30 m depth (Fedorenko et al. 1979).

Historical chum escapement estimates for individual streams in Area 22 (Fig. 3) are shown in Appendix 2a. Only five streams contribute to area stock production. Nitinat River is by far the major chum producer and was responsible for 95% of the total chum escapement to Area 22 during 1973 to 1982.

The age composition data available for Area 22 chum are shown in Appendix 3. The age data were applied to catch and escapement totals (Tables 2 and 3 respectively) and the rates of return for each brood year were calculated (Table 4). The rates of return available since the 1968 brood year, averaged 4.26:1 and ranged from 0.09:1 for 1972 brood to 13.99:1 for 1969 brood. The proportions of fish returning at ages 3, 4 and 5 averaged 0.34, 0.62 and 0.04 respectively and varied greatly among brood years. For example, proportion of 3-year olds returning from a specific brood year varied from 0.03 to 0.93 while for 4-year olds it varied from 0.05 to 0.94 (Table 4).

The total chum returns to Area 22 were plotted against the corresponding brood spawning escapements (Fig. 4). Due to data extremes, no optimum escapement levels were apparent for this area. Return rates were not correlated with the number of fish spawning in the brood year. When the rates of return from a brood year and age compositions vary widely and unpredictably, forecasting of returns is extremely difficult. A striking example of this was the unexpected catch of over 250,000 chum in 1980 which originated from relatively low brood stock escapement estimates of 19,700 in 1976 and 43,700 in 1977.

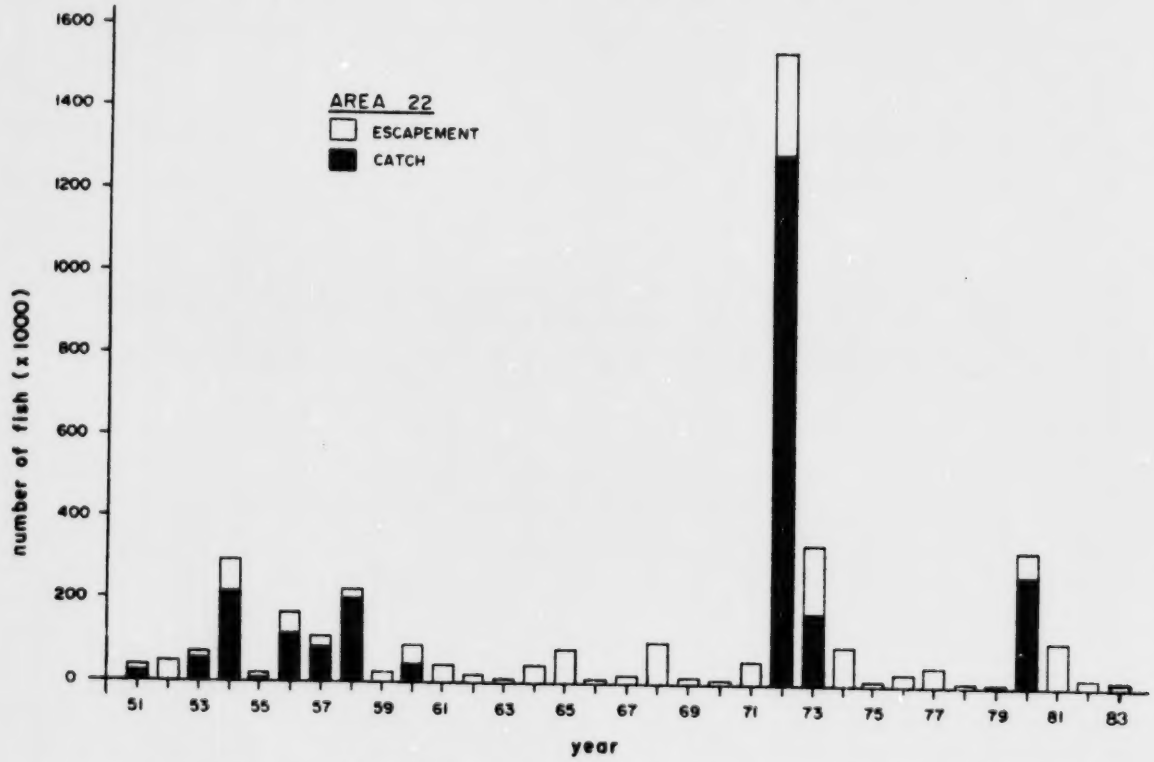


Fig. 2. Annual catch and escapement estimates for chum salmon in Area 22, 1951 - 1983.

Table 1. Annual catch, escapement and total stock estimates for chum salmon in Area 22, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	6,300	20,800	27,100	12,500	2.17	39,600
1952	0[c]	0	0	46,000	-	46,000
1953	26,500	33,400	59,900	16,500	3.63	76,400
1954	39,000	178,200	217,200	86,000	2.53	303,200
1955	3,400	3,800	7,200	12,500	0.58	19,700
1956	23,500	94,800	118,300	46,100	2.57	164,400
1957	19,200	66,100	85,300	23,300	3.66	108,600
1958	37,000	168,800	205,800	19,000	10.83	224,800
1959	0	0	0	23,000	-	23,000
1960	6,500	41,700	48,200	44,100	1.09	92,300
1961	0	0	0	44,200	-	44,200
1962	0	0	0	18,700	-	18,700
1963	0	0	0	6,700	-	6,700
1964	0	0	0	44,200	-	44,200
1965	0	0	0	80,300	-	80,300
1966	0	0	0	8,500	-	8,500
1967	0	0	0	21,200	-	21,200
1968	0	0	0	124,700	-	124,700
1969	0	0	0	18,800	-	18,800
1970	0	0	0	8,700	-	8,700
1971	0	0	0	55,200	-	55,200
1972	246,400	1,044,100	1,290,500	264,600	4.88	1,555,100
1973	50,000	124,800	174,800	171,000	1.02	345,800
1974	0	0	0	98,100	-	98,100
1975	0	0	0	9,900	-	9,900
1976	0	0	0	19,700	-	19,700
1977	0	0	0	43,700	-	43,700
1978	0	0	0	8,400	-	8,400
1979	0	0	0	4,500	-	4,500
1980	37,500	236,400	273,900	54,500	5.03	328,400
1981	0	0	0	115,000	-	115,000
1982	0	0	0	22,500	-	22,500
1983	0	0	0	8,000	-	8,000

[a] Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b] Catch and escapement numbers rounded to the nearest hundred.

[c] Zero catch indicates closed fishery or negligible catch, (< 50 pieces).

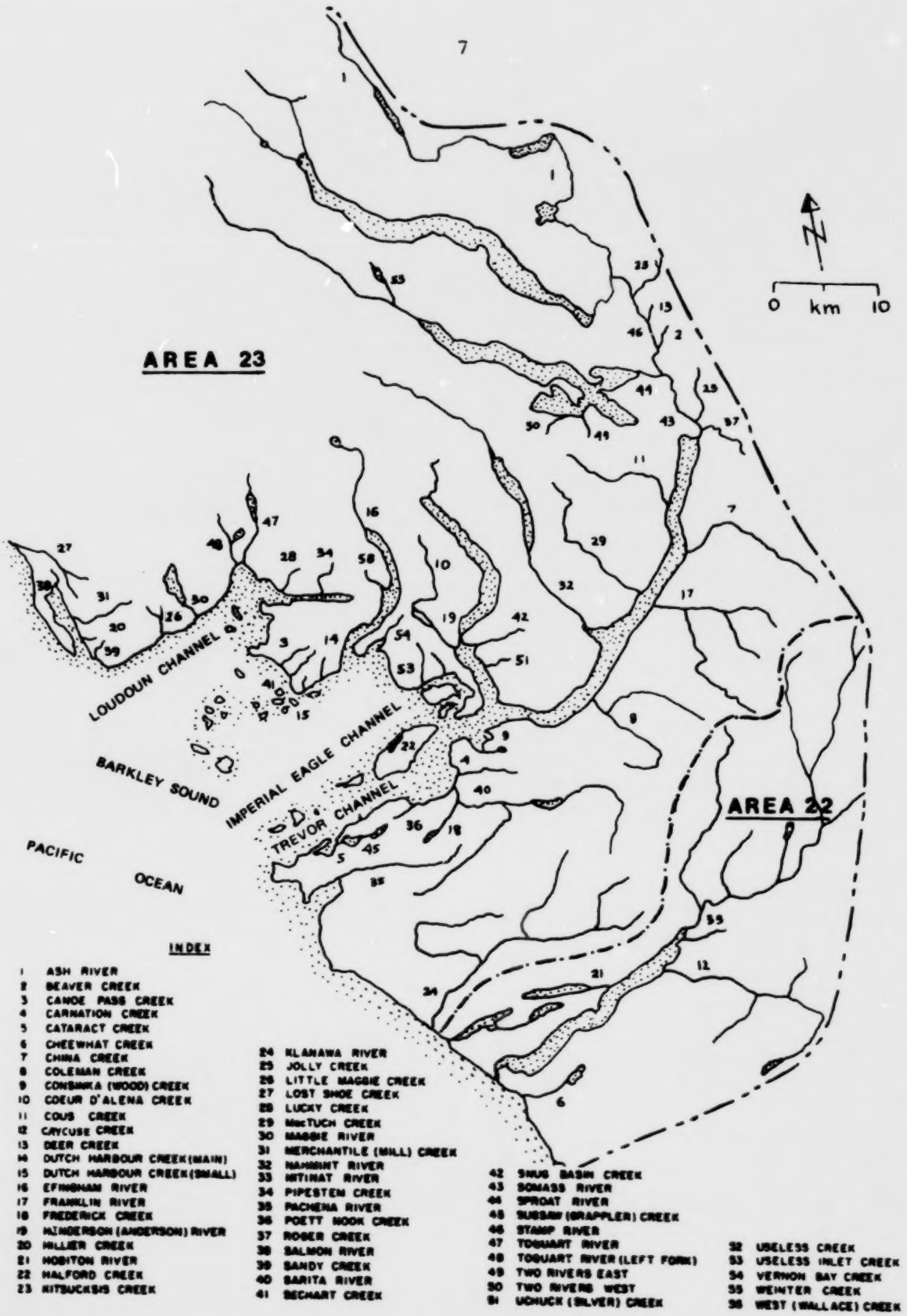


Fig. 3. Location of salmon spawning streams in Areas 22 and 23.

Table 2. Age breakdown of chum salmon catches in Area 22, 1971-1982.

YEAR	Catch	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1971	0	-	-		-	-		-	-	
1972	1,290,500	20,648	1.6	1969	1,269,852	98.4	1968	0	0.0	1967
1973	174,800	1,573	0.9	1970	91,420	52.3	1969	81,806	46.8	1968
1974	0	-	-		-	-		-	-	
1975	0	-	-		-	-		-	-	
1976	0	-	-		-	-		-	-	
1977	0	-	-		-	-		-	-	
1978	0	-	-		-	-		-	-	
1979	0	-	-		-	-		-	-	
1980	273,900	238,567	87.1	1977	35,333	12.9	1976	0	0.0	1975
1981	0	-	-		-	-		-	-	
1982	0	-	-		-	-		-	-	

Table 3. Age breakdown of chum salmon escapements in Area 22, 1971-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1971	55,200	52,826	95.7	1968	773	1.4	1967	1,601	2.9	1966
1972	264,600	4,234	1.6	1969	260,366	98.4	1968	0	0.0	1967
1973	171,000	1,539	0.9	1970	89,433	52.3	1969	80,028	46.8	1968
1974	98,100	38,651	39.4	1971	12,655	12.9	1970	46,794	47.7	1969
1975	9,900	7,524	76.0	1972	2,178	22.0	1971	198	2.0	1970
1976	19,700	4,058	20.6	1973	15,071	76.5	1972	571	2.9	1971
1977	43,700	3,671	8.4	1974	39,199	89.7	1973	830	1.9	1972
1978	8,400	2,654	31.6	1975	4,847	57.7	1974	899	10.7	1973
1979	4,500	2,061	45.8	1976	2,246	49.9	1975	194	4.3	1974
1980	54,500	47,470	87.1	1977	7,031	12.9	1976	0	0.0	1975
1981	115,000	1,150	1.0	1978	113,390	98.6	1977	460	0.4	1976
1982	22,500	2,385	10.6	1979	8,865	39.4	1978	11,048	49.1	1977

Table 4. Brood year summaries and rates of return for chum salmon in Area 22, 1968 - 1979.

BROOD		Age 3 Return				Age 4 Return				Age 5 Return				All Ages	
YEAR	Escapement	Year of Return	Catch	Escapement	Age 3 Rtn Ttl Rtn	Year of Return	Catch	Escapement	Age 4 Rtn Ttl Rtn	Year of Return	Catch	Escapement	Age 5 Rtn Ttl Rtn	Total Return	Ttl Rtn / Escapement
1968	124,700	1971	-	52,826	0.03	1972	1,269,852	260,366	0.88	1973	81,806	80,028	0.09	1,744,879	13.99
1969	18,800	1972	20,648	4,234	0.10	1973	91,420	89,433	0.72	1974	-	46,794	0.19	252,529	13.43
1970	8,700	1973	1,573	1,539	0.19	1974	-	12,656	0.79	1975	-	198	0.01	15,965	1.84
1971	55,200	1974	-	38,651	0.93	1975	-	2,178	0.05	1976	-	571	0.01	41,401	0.75
1972	264,600	1975	-	7,524	0.32	1976	-	15,071	0.64	1977	-	830	0.04	23,425	0.09
1973	171,000	1976	-	4,058	0.09	1977	-	39,199	0.89	1978	-	899	0.02	44,156	0.26
1974	98,100	1977	-	3,671	0.42	1978	-	4,847	0.56	1979	-	194	0.02	8,711	0.09
1975	9,900	1978	-	2,654	0.54	1979	-	2,246	0.46	1980	-	0	0.00	4,900	0.49
1976	19,700	1979	-	2,061	0.05	1980	35,333	7,031	0.94	1981	-	460	0.01	44,805	2.28
1977	43,700	1980	238,567	47,470	0.70	1981	-	113,390	0.28	1982	-	11,048	0.03	410,474	9.39
1978	8,400	1981	-	1,150	0.11[a]	1982	-	8,865	0.89[a]	1983	-	-	-	10,015	1.19[a]
1979	4,500	1982	-	2,385	1.00[a]	1983	-	-	-	1984	-	-	-	2,385	0.53[a]
Mean[b]					0.34				0.62				0.04		4.26
S.D.					0.29				0.27				0.05		5.41

[a] Incomplete.
[b] Mean of annual values, incomplete years excluded.

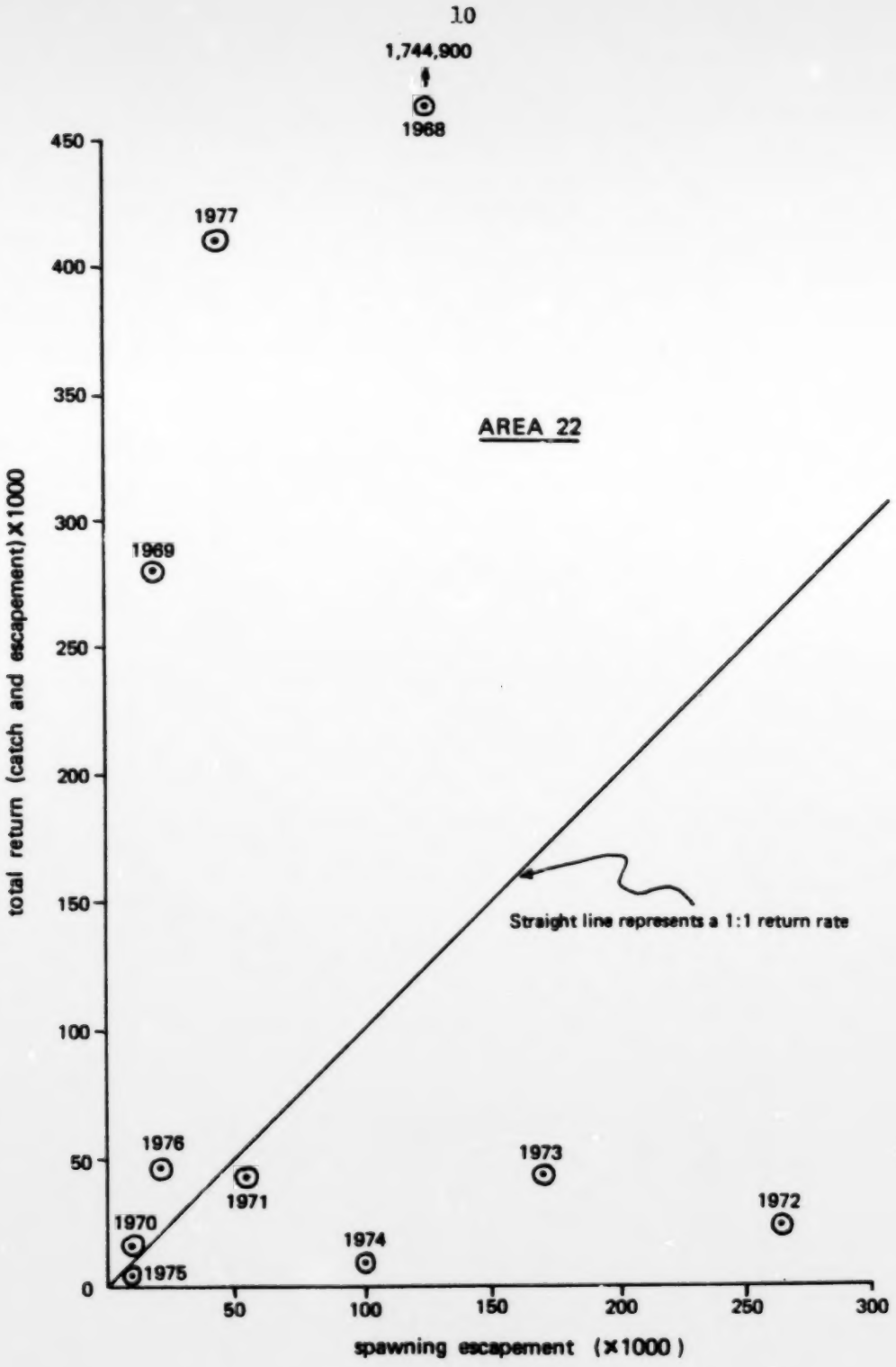


Fig. 4. Relationship between total returns and spawning escapements for chum salmon in Area 22, 1968 - 1977 brood years.

Uncertainty in escapement estimates also impedes accurate assessment of stocks and forecasting of future runs. A Peterson tag-recovery study carried out in 1979 on the Nitinat River system produced an escapement estimate of 14,300 chum while the visual estimate was ony 4,000 (250% difference) (McCart et al. MS 1980). Infrequent surveys and common flooding of streams in the area are two reasons for the uncertainty in spawner estimates.

The variations in stock size of WCVI chum salmon seem to be magnified in the Nitinat area where almost all spawning occurs in the Nitinat River. This watershed has been almost totally stripped of tree cover over a relatively short period of time, leading to extreme run-off fluctuations during fish spawning and incubation. However, conditions in the lake provide very favourable rearing environment and the available data show excellent growth rates for juvenile chum (Fedorenko et al. 1979).

Fish kills in Nitinat Lake have been reported on five occasions since 1950 (Fedorenko et al. 1979). These kills have been attributed to hydrogen sulfide poisoning resulting from partial inversion of the hydrogen sulfide water layer. The three main events responsible for these inversions are tides, extreme wind and storm conditions, and low precipitation (Fedorenko et al. 1979). Although adult chum were among the dead fish observed during the fish kills, the contribution of these kills to the extreme fluctuations of Nitinat chum stock is not known.

TEST FISHING

The Nitinat test fishery has been very limited due to the depressed condition of stock. The fishing was conducted each fall during 1978 to 1981 using a 15.9 cm (6 1/4)" regulation length gillnet. Methods are described in detail in Appendix 4. The primary objective of the test fishery was to obtain scale samples for age determination. However, some data on catch per hour set were also obtained.

The results of Area 22 test fisheries are summarized by week in Figure 5 and Table 5 (see also Appendix 4). Since the number of sets was small, no attempt was made to correlate test catches to stock strength. However, the extremely high catch per hour of over 200 fish observed in 1978 when the stock estimate was relatively low (Table 1) did not indicate a positive correlation.

FISH QUALITY STUDY IN AREAS 21 AND 22, 1981

Since the main goal of harvesting salmon is economic return, it is of concern to fishery managers to harvest chum salmon in the best possible condition. In order to harvest Nitinat chum as silver brights or semi-brights, a fishery outside the lake, in Area 21, was considered. Consequently, a study was undertaken in 1981 to compare chum condition before and after entering Nitinat Lake. The sets outside Nitinat Lake were made by the seine vessel "Pachena No. 1" on October 3, 10, and 13, 1981 and the sets inside were made by the gillnetter "Midnight Raider" from October 5 to 21, 1981. Details of fishing dates, catches, age sampling and fish quality are given in Appendix 5. A summary of the quality of fish landed is given in Table 6.

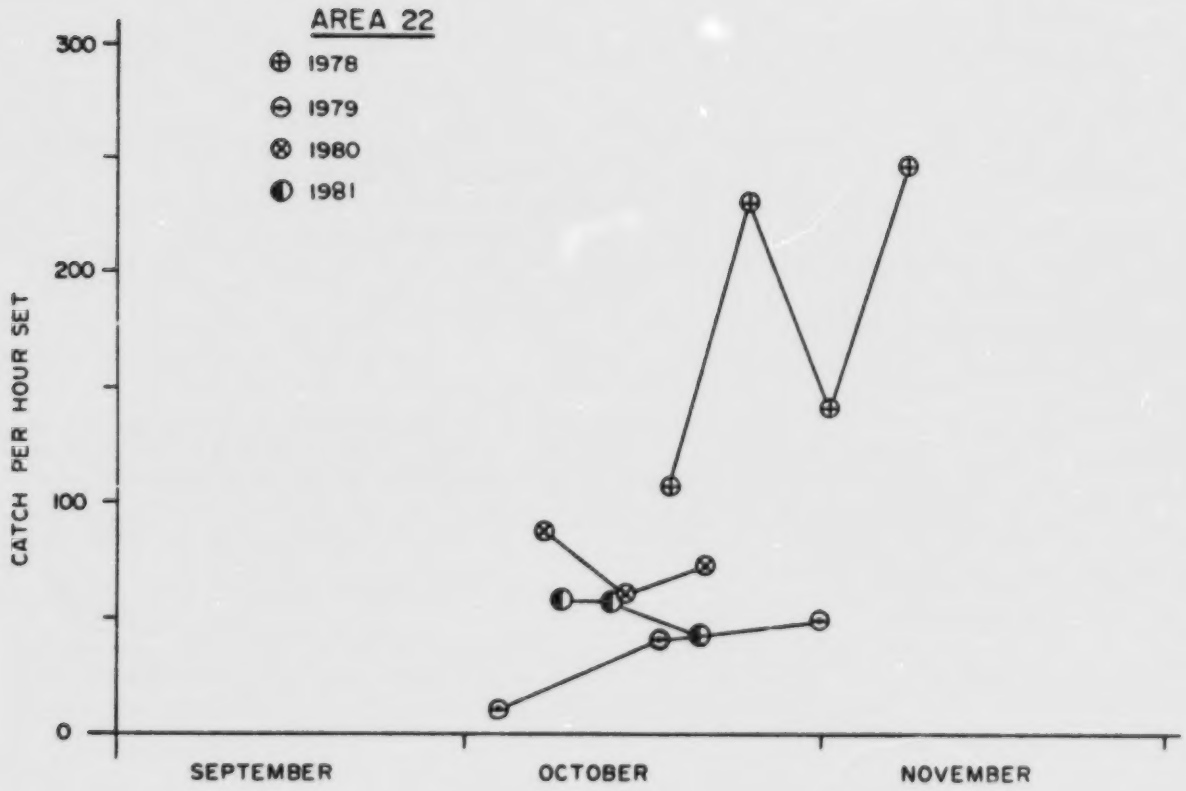


Fig. 5. Weekly mean catch per hour set in Area 22 chum test fishery, 1978 - 1981.

Table 5. Weekly mean catch per hour set in Area 22 chum test fishery, 1978-1981.

Week No.	Date	Mean catch/hr.	No. sets
1978			
E	Oct. 15 - 21	106.1	3
F	Oct. 22 - 28	230.3	3
G	Oct. 29 - Nov. 4	142.5	2
H	Nov. 5 - 11	246.5	2
1979			
C	Sept. 30 - Oct. 6	9.5	16
D	-	-	-
E	Oct. 14 - 20	37.4	21
F	-	-	-
G	Oct. 28 - Nov. 3	48.6	12
1980			
D	Oct. 5 - 11	87.9	4
E	Oct. 12 - 18	60.0	2
F	Oct. 19 - 25	64.8	13
1981			
D	Oct. 5 - 9	56.7	14
E	Oct. 13 - 14	56.0	12
F	Oct. 19 - 21	42.0	8
1982	(Area 21 - outside Nitinat Lake)[a]		
E	Oct. 13	33.8[b]	2[b]

[a] Should reflect Area 22 chum stock strength; no gillnet test fishery was conducted in the lake that year.
[b] Seine catch.

Table 6. Quality comparison of chum salmon caught in Area 21 and 22 test fisheries, 1981.

Source	Fish quality[a]		
	Semi-bright (%)	Quala (%)	Canners (%)
Outside (Area 21)	49.3	38.4	12.3
Inside (Area 22)	0.3	18.6	81.1
Inside (up to Oct. 15)	0.2	33.5	66.2

[a] Quala fish have darker skin and lighter meat than semi-bright fish; canners are slightly lower in quality than quala due to tissue damage from scars, net marks, etc.

A much greater percentage of bright fish was observed in the outside compared to the inside areas (49.3% vs 0.3% respectively). The much greater deterioration of fish quality among the "inside" chum was made particularly obvious when comparing the data up to October 15 when the fish from both the inside and outside areas were caught during approximately the same time period. The study concluded that a fishery held outside Nitinat Lake would yield higher quality, and therefore more valuable fish than an inside fishery. The incidental catch of chinook and coho did not appear to be a significant problem but mixing of Nitinat chum with other stocks could be a problem (see the discussion section). Chum age composition inside and outside Nitinat Lake was virtually the same with almost all the fish captured being 4-year-olds.

NITINAT HATCHERY

Nitinat hatchery, located at the confluence of the Nitinat and Little Nitinat Rivers, was completed in 1980. It is a Japanese-style hatchery with the capacity to incubate 28 million eggs and rear 20 million fry.

Chum production in the first three years of hatchery operation is summarized in Table 7. Maximum production was achieved in 1982 when 27.2 million chum fry were released into the lake at 1.1 g. Predicted adult returns from the hatchery operation for the period 1983 to 1986 are given in Table 8. These calculations were based on standard survivals adopted by SEP for chum salmon incubated and reared in freshwater (90% egg-to-fry, 80% fed fry-to-smolt and 2% smolt-to-adult survivals; 1981 revision) and an approximate age composition of 40% age 3 and 60% age 4 (SEP Operations estimates). These age estimates are higher than the 10-year mean age composition calculated for Area 22 for the 1973 to 1982 brood years (32% age 3 and 51% age 4, Appendix 3); however, the latter values were not used here due to the extreme annual age variability of the Nitinat chum and the lack of confidence limits. Since the variability in fry-to-adult survival was undetermined and since hatchery rearing could influence the age at which fish mature, data from several years of hatchery returns are required before valid confidence limits can be placed on the predicted returns. Assuming an optimum wild escapement of 125,000 chum plus 10,500 fish required for hatchery stock, the expected returns should yield harvestable surpluses in at least two years (1984 and 1985).

Since hatchery fry are reared and fed for about 60 days prior to release, their impact on the rearing capacity of Nitinat Lake will be of short duration. Fedorenko et al. (1979) reported that the abundance of wild salmon fry in Nitinat Lake peaks during April and May. So far, most Nitinat hatchery releases have been made during May. The same authors made a conservative estimate for rearing capacity of the lake at 20 to 340 million salmonid fry and concluded that hatchery releases of 30 million chum and 2 million chinook juveniles as well as the estimated 17 million wild fry rearing in the lake should not overtax the lake's food resources.

AREA 23 (BARKLEY SOUND)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 23 chum salmon for the period 1951 to 1983 are shown in Figure 6 and Table 9. The chum stocks in Area 23 have been fished in 26 of the above 33 years, with most major catches occurring before 1960. An extended fishery closure was implemented during the 1960's.

Table 7. Nitinat chum hatchery production, 1980-1982 broods.

Brood year	No. females	No. eggs taken	No. fry ponded	Mean size at release	No. released
1980	1,001	2,518,000	2,336,000	1.05	2,312,000
1981	10,564	29,522,000	27,532,000	1.10	27,178,000
1982	3,689	9,120,000	8,510,000	-	8,432,000

Table 8. Predicted annual returns of Nitinat hatchery chum salmon from 1980-1982 broods.

Brood year	Total adult production	Expected returns in			
		1983	1984	1985	1986
1980	46,240	18,500	27,700	-	-
1981	543,560	-	217,400	326,100	-
1982	168,640	-	-	67,500	101,200
Total	758,440	18,500	245,100	393,600	101,200

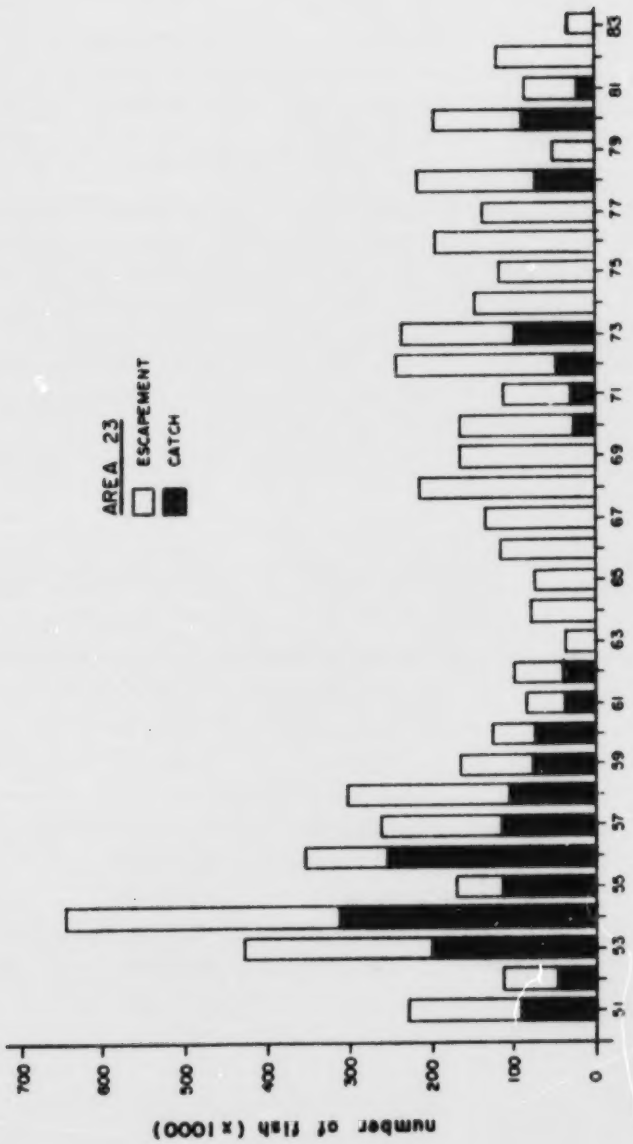


Fig. 8. Annual catch and escapement estimates for chum salmon in Area 23, 1951 - 1983.

Table 9. Annual catch, escapement and total stock estimates for chum salmon in Area 23, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	30,800	59,400	90,200	143,100	0.63	233,300
1952	15,600	29,500	45,100	68,000	0.66	113,100
1953	60,800	137,800	198,600	227,700	0.87	426,300
1954	69,400	246,300	315,700	326,900	0.97	642,600
1955	49,600	64,600	114,200	53,500	2.13	167,700
1956	79,000	178,300	257,300	93,900	2.74	351,200
1957	80,500	33,300	113,800	140,100	0.81	253,900
1958	79,700	24,000	103,700	200,900	0.52	304,600
1959	51,100	25,400	76,500	94,500	0.81	171,000
1960	53,600	17,400	71,000	54,400	1.31	125,400
1961	29,200	3,900	33,100	50,000	0.66	83,100
1962	27,600	9,900	37,500	58,200	0.64	95,700
1963	0[c]	0	0	36,100	-	36,100
1964	0	0	0	75,500	-	75,500
1965	0	0	0	70,200	-	70,200
1966	0	0	0	115,400	-	115,400
1967	0	0	0	134,300	-	134,300
1968	0	0	0	223,000	-	223,000
1969	0	0	0	170,400	-	170,400
1970	16,600	3,800	20,400	145,400	0.14	165,800
1971	15,600	9,500	25,100	89,900	0.28	115,000
1972	34,000	6,400	40,400	204,800	0.20	245,200
1973	61,300	34,400	95,700	147,300	0.65	243,000
1974	100	2,300	2,400	144,600	0.02	147,000
1975	1,500	60	1,560	115,400	0.01	116,960
1976	2,500	200	2,700	195,700	0.01	198,400
1977	100	400	500	128,000	.00	128,500
1978	16,400	53,500	69,900	150,100	0.47	220,000
1979	1,900	200	2,100	48,800	0.04	50,900
1980	37,500	49,900	87,400	115,700	0.76	203,100
1981	16,400	1,700	18,100	67,500	0.27	85,600
1982	800	600	1,400	119,000	0.01	120,400
1983	700	500	1,200	36,500	0.03	37,700

[a] Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b] Catch and escapement numbers rounded to the nearest hundred.

[c] Zero catch indicates closed fishery or negligible catch, (< 50 pieces).

Total area escapements between 1951 and 1983 have ranged from 36,100 in 1963 to 326,900 in 1954. Although the estimated optimum escapement for this area of 150,000 chum has been reached only eight times during that period, the escapements were generally considered adequate.

Historical chum escapement estimates for individual streams in Area 23 (Fig. 3) are shown in Appendix 2b. Nahmint, Sarita and Toquart Rivers have been the major chum producers in the area; together they contributed 66% to the total chum escapement to Area 23 during 1973 to 1982 (Table 10). Other significant producers have included Effingham River, Henderson River and Salmon Creek.

The age composition data available for Area 23 chum are shown in Appendix 3. Age data for Area 23 were not obtained in 1974 and 1981, and were derived using the overall annual WCVI age composition for the two years as the best available estimate (Area 22 was excluded from the 1974 overall age mean due to its unusually high age 5 component). The age data were applied to catch and escapement totals (Tables 11 and 12 respectively) and the rates of return for each brood year were calculated (Table 13). The rates of return, available since the 1956 brood year, averaged 1.09:1 and ranged from 0.41:1 for 1976 brood to 1.73:1 for 1977 brood. These rates have been relatively stable compared to those for Areas 22 and 26 (see a later section).

The proportions of fish returning at ages 3, 4 and 5 averaged 0.31, 0.65 and 0.04 respectively (Table 13). These values have been used in the past to predict the 4-year-old return from a brood year based on a known return of 3-year-olds. As in Area 22, this cannot be done with any confidence due to the considerable variability in the rates of return of each age class from a specific brood year.

The total chum returns to Area 23 were plotted against the corresponding brood spawning escapements (Fig. 7). The data indicated that the spawning capacity of Area 23 streams is considerably higher than the presently estimated optimum of 150,000 fish. Thus the total returns showed a continuously upward trend beyond the 150,000 brood spawning escapement with no indication that saturation of the spawning grounds has been reached. However, these results should be used with caution until methods are developed for isolating factors affecting fish survival beyond the freshwater life stage.

TEST FISHING

Test fishing was conducted in Area 23 each fall during 1977 to 1980 and again in 1982 using a 15.6 cm (6 1/8") regulation length gillnet. Methods are described in detail in Appendix 4. One of the objectives of the test fishery was to find a relationship, if any, between catch per unit effort and total stock size.

The results of the Area 23 test fisheries are summarized by week in Figure 8 and Table 14 (see also Appendix 4). In computing correlation coefficients between mean test catch and total stock estimate, average catches per hour were combined for various periods, for example weeks B to E each year. Data were examined separately for Trevor Channel, Imperial Eagle Channel, Trevor and Imperial Eagle combined and the whole area (including Loudoun Cnannel, Fig. 3). Loudoun Channel alone was omitted because too few sets were made there. Ucluelet Harbour sets were omitted in 1980 and 1982 because of the concentration of hatchery returns. Results of the analyses are shown in Table 15.

Table 10. Escapement levels for major chum producing streams in Area 23.

Stream	Maximum escapement since 1951	Mean escapement (1973 - 1982)
Nahmint River	100,000	24,800
Sarita River	75,000	43,100
Toquart River	75,000	13,000
Area 23 Total	326,900	123,200

Table 11. Age breakdown of chum salmon catches in Area 23, 1959-1982.

YEAR	Catch	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	76,500	31,671	41.4	1956	43,146	56.4	1955	1,683	2.2	1954
1960	71,000	33,157	46.7	1957	36,920	52.0	1956	923	1.3	1955
1961	33,100	17,179	51.9	1958	15,193	45.9	1957	596	1.8	1956
1962	37,500	21,578	57.5	1959	15,675	41.8	1958	150	0.4	1957
1963	0	-	-		-	-		-	-	
1964	0	-	-		-	-		-	-	
1965	0	-	-		-	-		-	-	
1966	0	-	-		-	-		-	-	
1967	0	-	-		-	-		-	-	
1968	0	-	-		-	-		-	-	
1969	0	0	16.0	1966	0	84.0	1965	0	0.0	1964
1970	20,400	7,997	39.2	1967	11,914	58.4	1966	490	2.4	1965
1971	25,100	7,555	30.1	1968	16,968	67.6	1967	577	2.3	1966
1972	40,400	4,121	10.2	1969	34,986	86.6	1968	1,293	3.2	1967
1973	95,700	14,259	14.9	1970	73,689	77.0	1969	7,752	8.1	1968
1974	2,400	566	23.6	1971	1,418	59.1	1970	415	17.3	1969
1975	1,560	346	22.2	1972	1,176	75.4	1971	39	2.5	1970
1976	2,700	146	5.4	1973	2,433	90.1	1972	122	4.5	1971
1977	500	184	36.7	1974	296	59.1	1973	21	4.2	1972
1978	69,900	7,759	11.1	1975	60,953	87.2	1974	1,188	1.7	1973
1979	2,100	853	40.6	1976	897	42.7	1975	351	16.7	1974
1980	87,400	57,771	66.1	1977	29,017	33.2	1976	612	0.7	1975
1981	18,100	1,213	6.7	1978	16,652	92.0	1977	235	1.3	1976
1982	1,400	260	18.6	1979	1,043	74.5	1978	95	6.8	1977

Table 12. Age breakdown of chum salmon escapements in Area 23, 1959-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	94,500	39,123	41.4	1956	53,298	56.4	1955	2,079	2.2	1954
1960	54,400	25,405	46.7	1957	28,288	52.0	1956	707	1.3	1955
1961	50,000	25,950	51.9	1958	22,950	45.9	1957	900	1.8	1956
1962	58,200	33,488	57.5	1959	24,328	41.8	1958	233	0.4	1957
1963	36,100	-	-		-	-		-	-	
1964	75,500	-	-		-	-		-	-	
1965	70,200	-	-		-	-		-	-	
1966	115,400	-	-		-	-		-	-	
1967	134,300	-	-		-	-		-	-	
1968	223,000	-	-		-	-		-	-	
1969	170,400	27,264	16.0	1966	143,136	84.0	1965	0	0.0	1964
1970	145,400	56,997	39.2	1967	84,914	58.4	1966	3,490	2.4	1965
1971	89,900	27,060	30.1	1968	60,772	67.6	1967	2,068	2.3	1966
1972	204,800	20,890	10.2	1969	177,357	86.6	1968	6,554	3.2	1967
1973	147,300	21,948	14.9	1970	113,421	77.0	1969	11,931	8.1	1968
1974	144,600	34,126	23.6	1971	85,459	59.1	1970	25,016	17.3	1969
1975	115,400	25,619	22.2	1972	87,012	75.4	1971	2,885	2.5	1970
1976	195,700	10,568	5.4	1973	176,326	90.1	1972	8,807	4.5	1971
1977	128,000	46,976	36.7	1974	75,648	59.1	1973	5,376	4.2	1972
1978	150,100	16,661	11.1	1975	130,887	87.2	1974	2,552	1.7	1973
1979	48,800	19,813	40.6	1976	20,838	42.7	1975	8,150	16.7	1974
1980	115,700	76,478	66.1	1977	38,412	33.2	1976	810	0.7	1975
1981	67,500	4,523	6.7	1978	62,100	92.0	1977	878	1.3	1976
1982	119,000	22,134	18.6	1979	88,655	74.5	1978	8,092	6.8	1977

Table 13. Brood year summaries and rates of return for chum salmon in Area 23, 1956 - 1979.

BROOD		Age 3 Return				Age 4 Return				Age 5 Return				All Ages	
YEAR	Escapement	Year of Return	Catch	Escapement	Age 3 Rtn / Ttl Rtn	Year of Return	Catch	Escapement	Age 4 Rtn / Ttl Rtn	Year of Return	Catch	Escapement	Age 5 Rtn / Ttl Rtn	Total Return	Ttl Rtn / Escapement
1956	93,900	1959	31,671	39,123	0.51	1960	36,920	28,288	0.47	1961	596	900	0.01	137,498	1.46
1957	140,100	1960	33,157	25,405	0.60	1961	15,193	22,950	0.39	1962	150	233	.00	97,088	0.69
1958	200,900	1961	17,179	25,950	0.52[a]	1962	15,675	24,378	0.48[a]	1963	-	-	-	83,132	0.41[a]
1959	94,500	1962	21,578	33,488	1.00[a]	1963	-	-	-	1964	-	-	-	55,066	0.58[a]
1960	54,400	1963	-	-	-	1964	-	-	-	1965	-	-	-	-	-
1961	50,000	1964	-	-	-	1965	-	-	-	1966	-	-	-	-	-
1962	58,200	1965	-	-	-	1966	-	-	-	1967	-	-	-	-	-
1963	36,100	1966	-	-	-	1967	-	-	-	1968	-	-	-	-	-
1964	75,500	1967	-	-	-	1968	-	-	-	1969	-	-	-	-	-
1965	70,200	1968	-	-	-	1969	-	143,136	0.97[a]	1970	490	3,490	0.03[a]	147,115	2.10[a]
1966	115,400	1969	-	27,264	0.22	1970	11,914	84,914	0.76	1971	577	2,068	0.02	126,736	1.10
1967	134,300	1970	7,997	56,997	0.43	1971	16,968	60,772	0.52	1972	1,293	6,554	0.05	150,580	1.12
1968	223,000	1971	7,955	27,060	0.13	1972	34,986	177,357	0.80	1973	7,752	11,931	0.07	266,641	1.20
1969	170,400	1972	4,121	20,890	0.11	1973	73,689	113,431	0.79	1974	415	25,016	0.11	237,551	1.39
1970	145,400	1973	14,259	21,948	0.29	1974	1,418	85,459	0.69	1975	39	2,885	0.02	126,008	0.87
1971	89,900	1974	566	14,136	0.26	1975	1,176	87,012	0.67	1976	122	8,807	0.07	131,808	1.47
1972	204,800	1975	346	25,619	0.12	1976	2,433	176,326	0.85	1977	21	5,376	0.03	210,191	1.03
1973	147,300	1976	146	10,568	0.12	1977	296	75,648	0.84	1978	1,188	2,552	0.04	90,397	0.61
1974	144,600	1977	184	46,976	0.19	1978	60,953	130,887	0.78	1979	351	8,150	0.03	247,500	1.71
1975	115,400	1978	7,759	16,661	0.51	1979	897	20,838	0.46	1980	612	810	0.03	47,576	0.41
1976	195,700	1979	853	19,813	0.23	1980	29,017	38,412	0.76	1981	235	878	0.01	89,207	0.46
1977	128,000	1980	57,771	76,478	0.61	1981	16,652	62,100	0.36[a]	1982	95	8,092	0.04	221,188	1.73
1978	150,100	1981	1,213	4,543	0.06[a]	1982	1,045	88,655	0.94[a]	1983	-	-	-	95,433	0.64[a]
1979	48,600	1982	260	22,134	1.00[a]	1983	-	-	-	1984	-	-	-	22,394	0.46[a]
Mean[b]					0.31				0.65				0.04		1.09
S.D.					0.18				0.17				0.03		0.42

[a] Incomplete.
[b] Mean of annual values, incomplete years excluded.

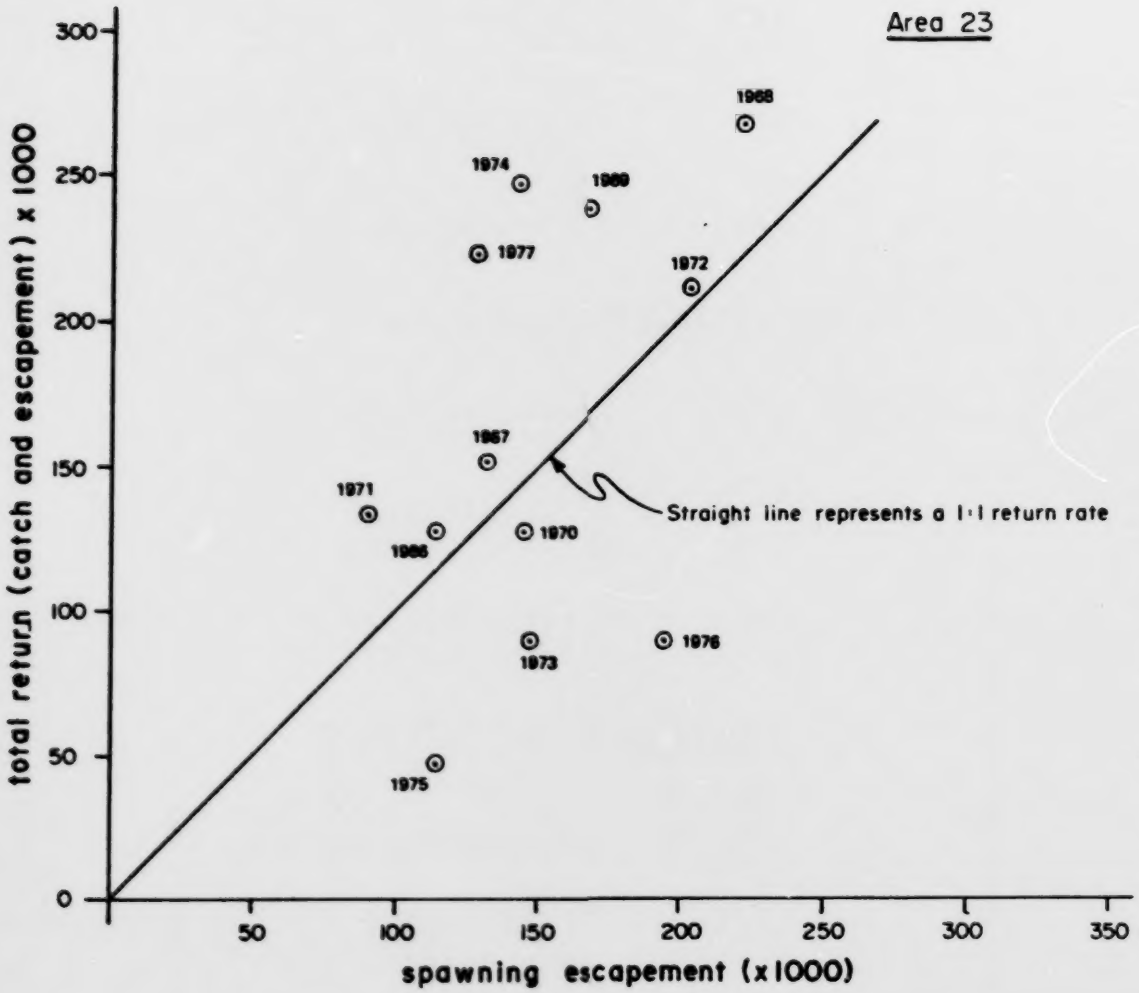


Fig. 7. Relationship between total returns and spawning escapements for chum salmon in Area 23, 1966 - 1977 brood years.

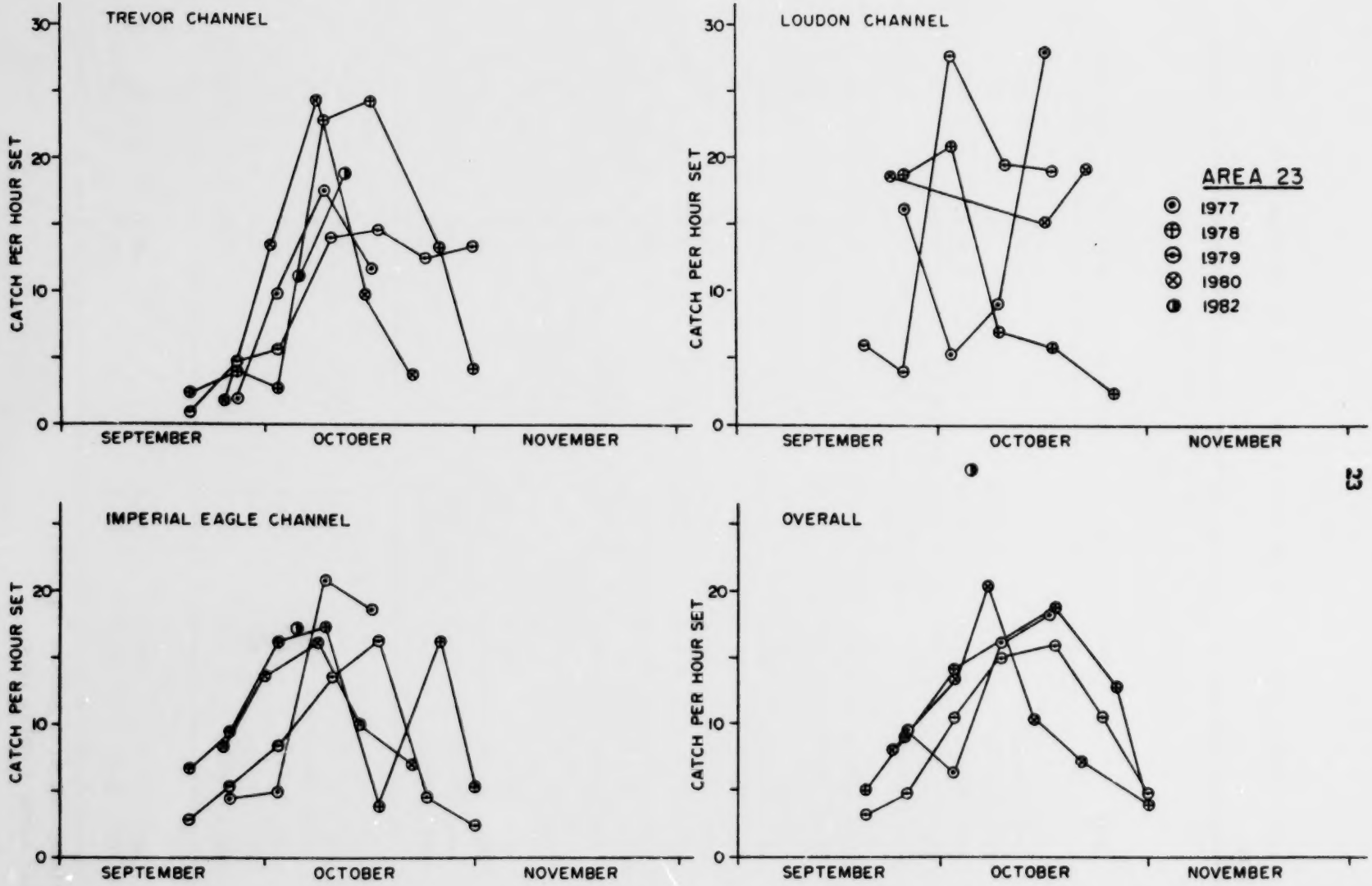


Fig. 8. Weekly mean catch per hour set in Area 23 chum test fishery, 1977 - 1982.

Table 14. Weekly mean catch per hour set in Area 23 chum test fishery, 1977-1982.

Week No.	Date	Mean catch/hr: Trevor Channel	Imperial Eagle	Loudoun Channel[a]	Overall[b]	No. sets
1977						
B	Sept. 24-26	1.8	4.5	16.2	9.5	20
C	Oct. 1-3	9.9	5.0	5.4	6.4	25
D	Oct. 8-10	17.5	20.8	9.1	16.2	12
E	Oct. 15-17	11.7	18.7	28.0	18.3	13
1978						
A	Sept. 18-20	2.3	6.7	-	5.1	11
B	Sept. 24-26	4.1	9.5	18.8	9.2	15
C	Oct. 1-3	2.7	16.2	20.9	14.0	12
D	Oct. 8-10	22.7	17.3	7.0	15.9	11
E	Oct. 16-18	24.3	4.0	5.8	18.8	10
F	Oct. 25-27	13.2	16.4	2.5	12.8	19
G	Oct. 31	4.2	5.4	0.0	3.9	7
1979						
A	Sept. 18-21	0.7	2.8	6.0	3.2	15
B	Sept. 24-27	4.5	5.3	4.0	4.7	22
C	Oct. 1-5	5.3	8.5	27.6	10.5	29
D	Oct. 9-12	13.9	13.6	19.5	15.1	22
E	Oct. 15-19	14.5	16.3	19.1	16.0	25
F	Oct. 23-25	12.3	4.7	-	10.5	13
G	Oct. 30-Nov. 1	13.4	2.5	-	9.7	18
1980						
B	Sept. 21-27	1.8	8.4	18.6	8.0	28
C	Sept. 28-Oct. 4	13.3	13.6	-	13.5	21
D	Oct. 5-11	24.3	16.6	-	20.5	21
E	Oct. 12-18	9.6	10.0	15.3	10.3	31
F	Oct. 19-25	3.8	7.1	19.2	7.2	15
1982						
D	Oct. 4-7	11.1	16.8	-	29.3	22
E	Oct. 12-15	18.1	54.3	-	37.5	9

[a] Excludes Ucluelet Harbour in 1980.

[b] Total catch ÷ total sets.

Table 15. Mean catch per hour in Area 23 chum test fishery related to total chum stock in that area, 1977-1982 (r=correlation coefficient).

Period examined (week code)[a]	Year	Mean catch/hr a) Trevor Channel	b) Imperial Eagle	c) Combined (a) + (b)	d) Overall	Total stock estimate	Critical r value (95% CL)
Week B-E	1977	10.2	12.3	11.3	12.6	128,500	
	1978	13.5	11.8	12.7	14.5	220,000	
	1979	9.6	10.9	10.3	11.6	50,900	
	1980	12.3	12.2	12.3	13.1	203,100	
	r	0.95	0.67	1.00	0.92		0.95
Week B-C	1977	5.9	4.8	5.4	8.0	128,500	
	1978	3.4	12.9	8.2	11.6	220,000	
	1979	4.9	6.9	5.9	7.6	50,900	
	1980	7.6	11.0	9.3	10.8	203,100	
	r	0.04	0.79	0.81	0.94		0.95
Week D-E	1977	14.6	19.8	16.3	17.3	128,500	
	1978	23.7	12.3	18.4	17.4	220,000	
	1979	14.2	15.0	14.6	15.6	50,900	
	1980	15.3	13.3	14.9	15.4	203,100	
	1982	14.1	35.6[b]	13.7	33.4	120,400	
	r	0.69	-0.50	0.60	-0.16		0.88[c]
Week D	1977	17.5	20.8	18.6	16.2	128,500	
	1978	22.7	17.3	19.3	15.9	220,000	
	1979	13.9	13.6	13.8	15.1	50,900	
	1980	24.3	16.6	22.5	20.5	203,100	
	1982	11.1	16.8	13.8	29.3	120,400	
		0.83	0.37	0.82	0.01		0.88

[a] See Table 14.

[b] Omitted from analysis since only two sets were made.

[c] Critical r value for Imperial Eagle is 0.95.

The only significant "r" values ($p<0.05$) were obtained for weeks B to E "Trevor Channel/Imperial Eagle combined". Attempts to correlate early catches (weeks B and C) to total stock to see if an early prediction could be made were unsuccessful. Weeks D and E combined and D alone were examined in order to incorporate the 1982 data but again no significant correlations were observed.

The reliability of the test fishery program as a management tool seems to depend on a large number of sets being made in a variety of conditions, especially early in the run. Results are encouraging and test fishing in Area 23 should continue on a similar scale.

THORNTON CREEK HATCHERY

Chum eggs from creeks in the Ucluelet Harbour area (mainly Salmon Creek, Fig. 3) were incubated at a small pilot hatchery at Thornton Creek from 1976 to 1978 (under SEP) and in 1981 and 1982 (as a Public Involvement Project). Between 0.4 and 1.4 million chum fry were released each year from the hatchery (Table 16). Predicted adult returns from hatchery operation are given in Table 17 and are based on similar assumptions as given for the Nitinat hatchery production (see section above). These estimates are of limited value as shown by the great disparity between the actual and predicted (using SEP bio-standards) returns for the 1977 and 1978 broods. Present plans involve the use of Thornton Creek hatchery for incubation and rearing of chinook and coho, and the reduction or discontinuation of chum production.

UCLUELET HARBOUR GILLNET FISHERIES

In 1980 and 1981, small gillnet fisheries were held in Ucluelet Harbour to harvest chum returning to Thornton Creek. Chum catches totalled 31,000 fish in 1980 and 5,100 in 1981.

AREA 24 (CLAYOQUOT SOUND)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 24 chum salmon for the period 1951 to 1983 are shown in Figure 9 and Table 18. The chum stocks in Area 24 have been fished in 23 of the above 33 years, with an extended fishery closure implemented during the 1960's. Total area escapements between 1951 and 1983 have ranged from 9,000 in 1965 to 128,000 in 1954. The estimated optimum escapement of 100,000 chum for this area has been reached only three times since 1951 and the total stock has exceeded this figure only 10 times during the same period. Further data, especially on rates of return, are necessary to estimate the optimum escapement for this area.

Historical chum escapement estimates for individual streams in Area 24 (Fig. 10) are shown in Appendix 2c. Atleo, Megin and Moyeha Rivers and Tranquil and Bawden Bay Creeks have been the major chum producers in the area; together they contributed 70% to the total chum escapement to Area 24 during 1973 to 1982 (Table 19).

The age composition data available for Area 24 chum are shown in Appendix 3. Age data for Area 24 were not obtained in 1981, and were derived using the overall WCVI age composition for that year as the best available estimate. The

Table 16. Thornton Creek chum hatchery production, 1976-1982 broods.

Brood year	No. females	No. eggs taken	No. fry ponded	Mean size at release (g)	No. released
1976	390[a]	1,099,100	1,011,600	0.9	874,100
1977	492	1,201,900	1,105,000	0.8	1,076,100
1978	630[a]	1,776,400	1,618,900	1.2	1,387,100
1979	-	-	-	-	-
1980	-	-	-	-	-
1981	615[a]	1,502,200	1,290,000	0.7	1,276,900
1982	280[a]	780,300	682,900	1.2 - 1.4	165,600
				0.5	209,000

[a] Estimated using 1977 fecundity of 2400 eggs/female.

Table 17. Predicted and actual annual returns of Thornton Creek hatchery chum salmon from 1976-1982 broods.

	Total adult production		Expected returns in							
Brood year	Predicted	Actual[a]	1979	1980	1981	1982	1983	1984	1985	1986
1976	17,500	-	7,000	10,500	-	-	-	-	-	-
1977	21,500	62,200	-	8,600	12,900	-	-	-	-	-
1978	27,700	6,800	-	-	11,100	16,600	-	-	-	-
1979	0	-	-	-	-	0	0	-	-	-
1980	0	-	-	-	-	-	0	0	-	-
1981	25,000	-	-	-	-	-	-	10,200	15,300	-
1982	6,200[b]	-	-	-	-	-	-	-	2,500	3,700
Total	98,400	-	7,000	19,100	24,000	16,600	0	10,200	17,800	3,700

[a] Total catch plus escapement minus estimated wild returns.

[b] Used 1.4% fry-to-adult survival for unfed fry and 2% for fed fry (BSP bio-standards).

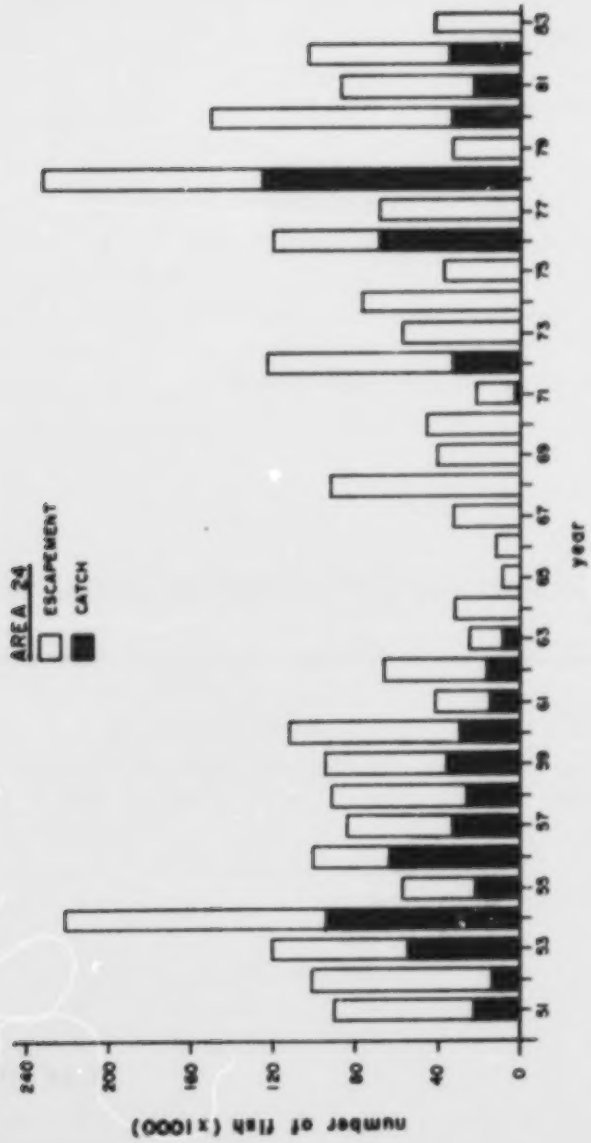


Fig. 9. Annual catch and escapement estimates for chum salmon in Area 24, 1951 - 1983.

Table 18. Annual catch, escapement and total stock estimates for chum salmon in Area 24, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	300	22,300	22,600	69,000	0.33	91,600
1952	300	13,100	13,400	89,400	0.15	102,800
1953	500	55,400	55,900	65,900	0.85	121,800
1954	900	95,000	95,900	128,000	0.75	223,900
1955	600	20,500	21,100	37,800	0.56	58,900
1956	800	52,700	53,500	48,400	1.11	101,900
1957	4,100	29,500	33,600	50,600	0.66	84,200
1958	3,000	21,400	24,400	69,100	0.35	93,500
1959	6,400	31,000	37,400	60,200	0.62	97,600
1960	5,800	23,000	28,800	84,400	0.34	113,200
1961	6,300	8,900	15,200	25,800	0.59	41,000
1962	2,500	14,800	17,300	48,600	0.36	65,900
1963	1,600	7,300	8,900	15,600	0.57	24,500
1964	0[c]	0	0	32,600	-	32,600
1965	0	0	0	9,000	-	9,000
1966	0	0	0	12,300	-	12,300
1967	0	0	0	32,600	-	32,600
1968	0	0	0	94,200	-	94,200
1969	0	0	0	39,500	-	39,500
1970	0	0	0	45,400	-	45,400
1971	0	3,000	3,000	18,500	0.16	21,500
1972	800	33,000	33,800	90,400	0.37	124,200
1973	100	0	100	58,300	.00	58,400
1974	0	0	0	78,300	-	78,300
1975	0	0	0	37,700	-	37,700
1976	6,600	61,600	68,200	53,100	1.28	121,300
1977	300	1,500	1,800	68,200	0.03	70,000
1978	14,100	110,700	124,800	110,300	1.13	235,100
1979	0	1,200	1,200	29,600	0.04	30,800
1980	9,100	26,500	35,600	118,000	0.30	153,600
1981	3,800	18,600	22,400	63,900	0.35	86,300
1982	8,800	29,200	38,000	73,000	0.52	111,000
1983	0	0	0	47,800	-	47,800

[a]Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b]Catch and escapement numbers rounded to the nearest hundred.

[c]Zero catch indicates closed fishery or negligible catch, (< 50 pieces).

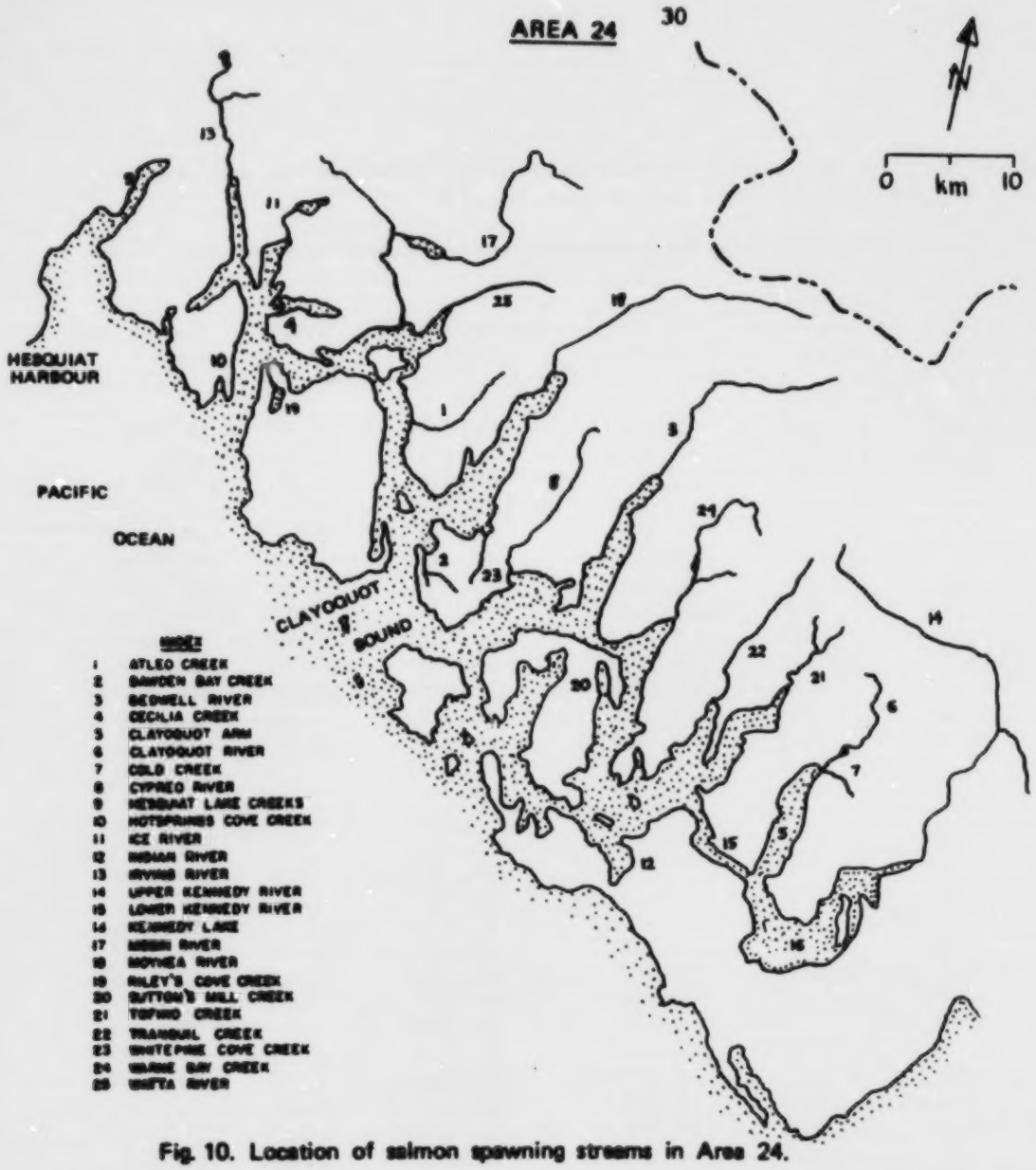


Fig. 10. Location of salmon spawning streams in Area 24.

Table 19. Escapement levels for major chum producing streams in Area 24.

Stream	Maximum escapement since 1951[a]	Mean escapement (1973 - 1982)
Atleo River	58,000	22,000
Bawden Bay Creek	15,000	4,100
Megin River	30,000	11,400
Moyeha River	15,000	6,800
Tranquil Creek	35,000	4,300
Area 24 Total	128,000	69,000

[a] Recent escapements to these streams are all less than half the maximum levels.

age data were applied to catch and escapement totals (Tables 20 and 21 respectively) and the rates of return for each brood year were calculated (Table 22). The rates of return available since the 1971 brood year averaged 1.79:1 and ranged from 0.99:1 for 1973 brood to 2.98:1 for 1974 brood. The proportions of fish returning at ages 3, 4 and 5 averaged 0.33, 0.64 and 0.03 respectively (Table 22). The total chum returns to Area 24 were plotted against the corresponding brood spawning escapements (Fig. 11) but no obvious trends were isolated. The relatively high total rate of return of 1.30 observed for the 1975 brood (Table 22) suggested that, compared to other NCVI areas, this brood progeny suffered smaller incubation losses from the 1975 fall floods. The watersheds of two major chum producers in Area 24, the Atleo and Megin Rivers, were still unlogged in 1975 and the rest of the stock is scattered in small streams where damage from floods is generally reduced.

TEST FISHING

Test fishing was conducted in Area 24 each fall during 1977 to 1980 using a 15.6 cm (6 1/8") regulation length gillnet. The results are summarized by week in Figure 12 and Table 23 (see also Appendix 4). Significant correlations ($p < 0.05$) were found between test fishery catches and total stock size for periods up to week C and weeks B-E (Table 24) suggesting that test fishery in Area 24 may be developed into a useful management tool given a greater test fishing effort.

AREA 25 (NOOTKA SOUND)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 25 chum salmon for the period 1951 to 1983 are shown in Figure 13 and Table 25. The chum stocks in Area 25 have been fished in 28 of the above 33 years making it the most consistent NCVI producer. Total area escapements between 1951 and 1983 have ranged from 31,700 in 1955 to 293,900 in 1960. The estimated optimum escapement for the area of 100,000 chum has been reached or exceeded 16 times since 1951.

Historical chum escapement estimates for individual streams in Area 25 (Fig. 14) are shown in Appendix 2d. Chum production has been relatively uniform among the area streams, with Conuma, Inner Basin, Tahsis and Zeballos Rivers being the major producers; together they contributed 37% to the total chum escapement to Area 25 during 1973 to 1982 (Table 26). Other consistent chum producers include Burman River, Canton Creek, Chum Creek, Deserted Creek, Leiner River, Park River, Sucwoa River, Tlupana River and Tsowwin River. All have had maximum escapements of around 15,000 and a frequent escapement range from 1,500 to 75,000.

The age composition data available for Area 25 chum are shown in Appendix 3. Age data for Area 25 were not obtained in 1981, and were derived using the overall NCVI age composition for that year as the best available estimate. The age data were applied to catch and escapement totals (Tables 27 and 28 respectively) and the rates of return for each brood year were calculated (Table 29). The rates of return, calculated since the 1956 brood year, averaged 2.67:1 and ranged from 0.22:1 for 1973 brood to 10.35:1 for 1957 brood. The proportions of fish returning at ages 3, 4 and 5 averaged 0.38, 0.58 and 0.04 respectively (Table 29). The total chum returns to Area 25 were plotted against the corresponding brood spawning escapements (Fig. 15). The estimated optimum

Table 20. Age breakdown of chum salmon catches in Area 24, 1974-1982.

YEAR	Catch	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1974	0	-	-		-	-		-	-	
1975	0	-	-		-	-		-	-	
1976	68,200	9,412	13.8	1973	57,697	84.6	1972	955	1.4	1971
1977	1,800	787	43.7	1974	925	51.4	1973	88	4.9	1972
1978	124,800	16,598	13.3	1975	105,581	84.6	1974	2,621	2.1	1973
1979	1,200	422	35.2	1976	641	53.4	1975	137	11.4	1974
1980	35,600	23,888	67.1	1977	11,463	32.2	1976	285	0.8	1975
1981	22,400	1,501	6.7	1978	20,608	92.0	1977	291	1.3	1976
1982	38,000	8,436	22.2	1979	29,564	77.8	1978	0	0.0	1977

Table 21. Age breakdown of chum salmon escapements in Area 24, 1974-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1974	78,300	15,347	19.6	1971	45,649	58.3	1970	17,304	22.1	1969
1975	37,700	15,042	39.9	1972	22,356	59.3	1971	302	0.8	1970
1976	53,100	7,328	13.8	1973	44,923	84.6	1972	743	1.4	1971
1977	68,200	29,803	43.7	1974	35,055	51.4	1973	3,342	4.9	1972
1978	110,300	14,670	13.3	1975	93,314	84.6	1974	2,316	2.1	1973
1979	29,600	10,419	35.2	1976	15,806	53.4	1975	3,374	11.4	1974
1980	118,000	79,178	67.1	1977	37,996	32.2	1976	944	0.8	1975
1981	63,900	4,281	6.7	1978	58,788	92.0	1977	831	1.3	1976
1982	73,000	16,206	22.2	1979	56,794	77.8	1978	0	0.0	1977

Table 22. Brood year summaries and rates of return for chum salmon in Area 24, 1971 - 1979.

BROOD		Age 3 Return				Age 4 Return				Age 5 Return				All Ages	
YEAR	Escapement	Year of Return	Catch	Escapement	Age 3 Rtn: Ttl Rtn	Year of Return	Catch	Escapement	Age 4 Rtn: Ttl Rtn	Year of Return	Catch	Escapement	Age 5 Rtn: Ttl Rtn	Total Return	Ttl Rtn / Escapement
1971	18,500	1974	0	15,347	0.39	1975	0	22,356	0.57	1976	955	743	0.04	39,401	2.13
1972	90,400	1975	0	15,042	0.12	1976	57,697	44,923	0.85	1977	88	3,342	0.03	121,092	1.34
1973	58,300	1976	9,412	7,328	0.29	1977	925	35,055	0.62	1978	2,621	2,316	0.09	57,657	0.99
1974	78,300	1977	787	29,803	0.13	1978	105,581	93,314	0.85	1979	137	3,374	0.02	232,996	2.98
1975	37,700	1978	16,598	14,670	0.64	1979	641	15,806	0.34	1980	285	944	0.03	48,944	1.30
1976	53,100	1979	422	10,419	0.18	1980	11,463	37,996	0.81	1981	291	831	0.02	61,423	1.16
1977	68,200	1980	23,888	79,178	0.56	1981	20,608	58,788	0.44	1982	0	0	0.00	182,462	2.68
1978	110,300	1981	1,501	4,281	0.06[a]	1982	29,564	56,794	0.94[a]	1983	-	-	-	92,140	0.84[a]
1979	29,600	1982	8,436	16,206	1.00[a]	1983	-	-	-	1984	-	-	-	24,642	0.83[a]
Mean[b]					0.33				0.64				0.03		1.79
S.D.					0.19				0.19				0.03		0.74

[a] Incomplete.
[b] Mean of annual values, incomplete years excluded.

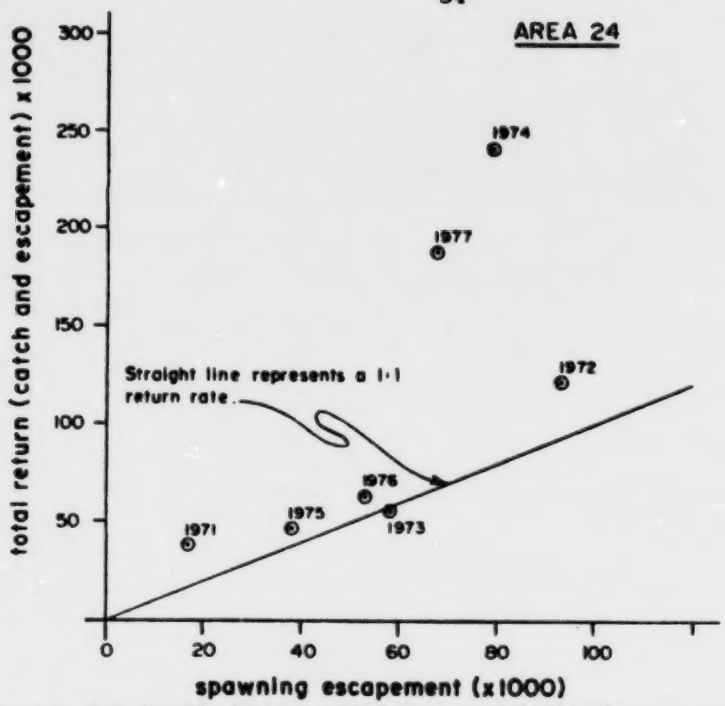


Fig. 11. Relationship between total returns and spawning escapements for chum salmon in Area 24, 1971 - 1977 brood years.

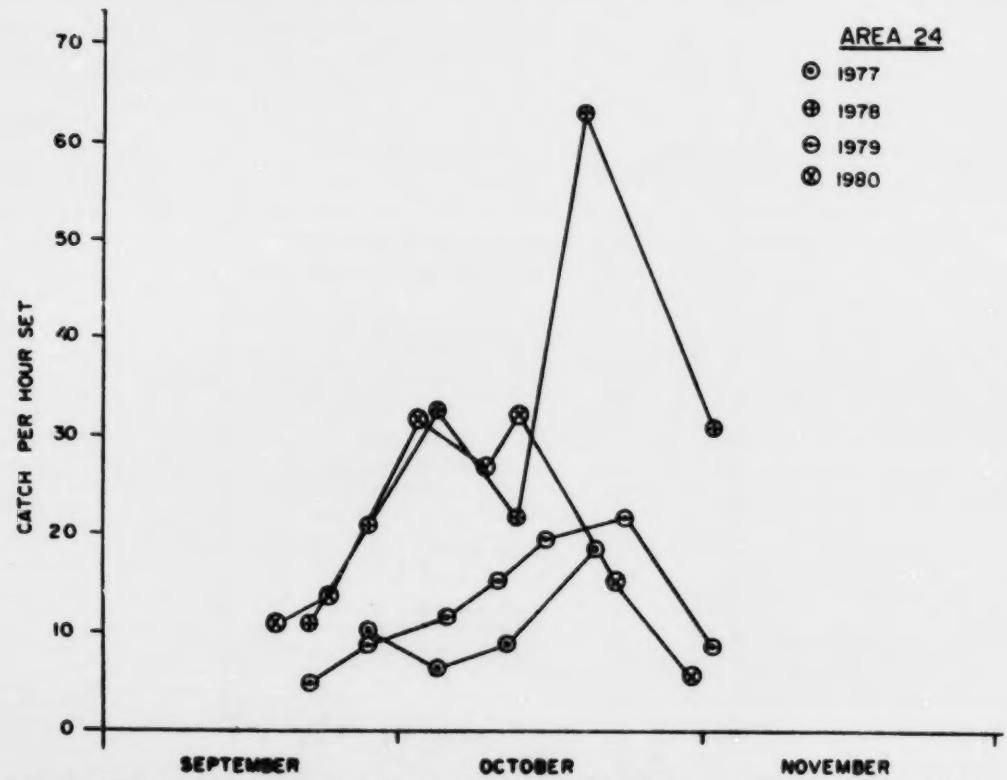


Fig. 12. Weekly mean catch per hour set in Area 24 chum test fishery, 1977 - 1980.

Table 23. Weekly mean catch per hour set in Area 24 chum test fishery, 1977-1980.

Week No.	Date	Mean catch/hr	No. sets
1977			
B	Sept. 27-28	10.2	16
C	Oct. 4-5	6.3	18
D	Oct. 11-12	8.7	12
E	Oct. 20-21	18.6	19
1978			
A	Sept. 21-22	10.9	12
B	Sept. 27-28	20.8	11
C	Oct. 4-5	32.4	10
D	Oct. 11-13	21.8	13
E	Oct. 19-20	62.9	9
G	Nov. 1-2	30.7	9
1979			
A	Sept. 21-22	4.9	10
B	Sept. 26-28	8.7	15
C	Oct. 5-6	11.6	11
D	Oct. 7-13	15.3	23
E	Oct. 14-17	19.7	16
F	Oct. 21-26	21.9	20
G	Oct. 31-Nov. 3	8.6	16
1980			
A	Sept. 17-19	10.8	13
B	Sept. 21-24	13.0	16
C	Sept. 28-Oct. 4	31.8	14
D	Oct. 6-11	27.4	25
E	Oct. 12-13	31.7	8
F	Oct. 20-25	16.1	10
G	Oct. 26-Nov. 3	6.1	8

Table 24. Mean catch per hour in Area 24 chum test fishery related to total chum stock in that area, 1977-1980 (r=correlation coefficient).

Period examined (week code)[a]	Year	Mean catch/hr Overall area	Total stock estimate	Critical r value (95% CL)
Up to week C	1977	8.3	70,000	
	1978	21.4	235,100	
	1979	8.4	30,800	
	1980	18.5	153,500	
	r	0.96		0.95
Week B-D	1977	8.4	70,000	
	1978	25.0	235,100	
	1979	11.9	30,800	
	1980	24.1	153,500	
	r	0.89		0.95
Week B-E	1977	11.0	70,000	
	1978	34.5	235,100	
	1979	13.8	30,800	
	1980	26.0	153,500	
	r	0.96		0.95
Overall	1978	29.9	235,100	
	1979	13.0	30,800	
	1980	19.6	153,500	
	r	0.97		1.00

[a] See Table 23.

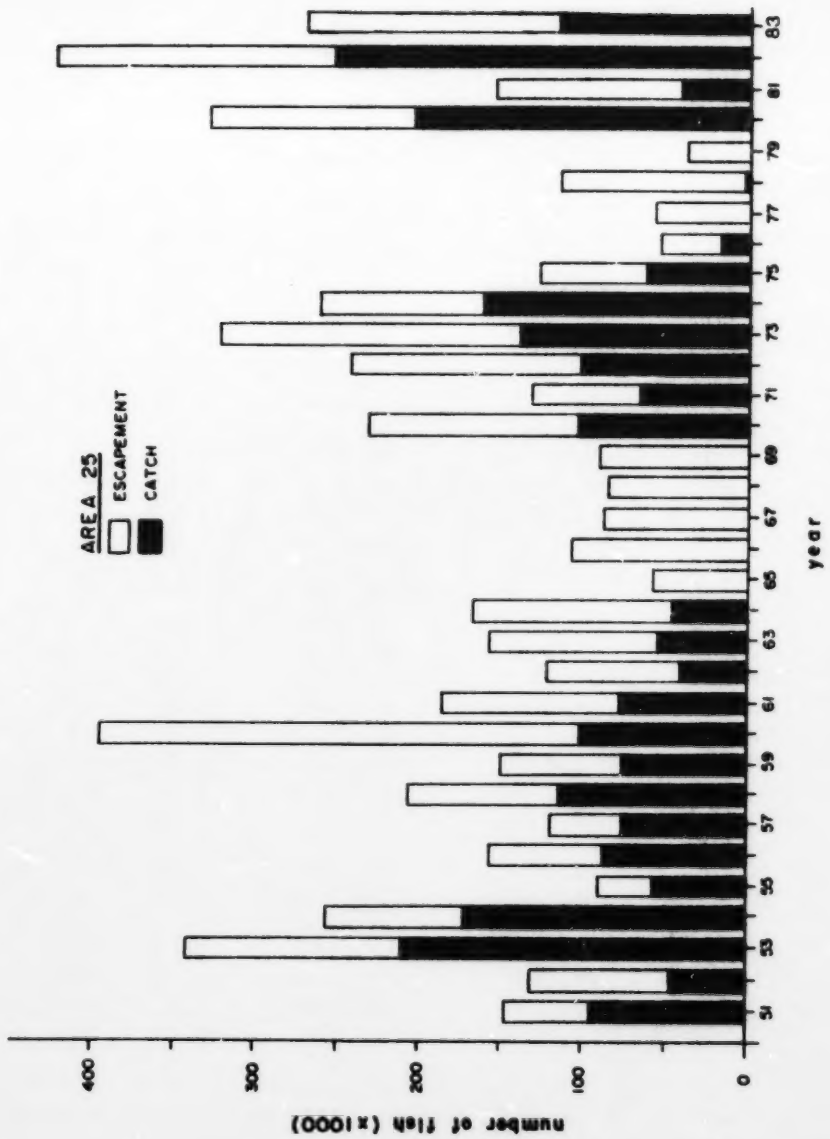


Fig. 13. Annual catch and escapement estimates for chum salmon in Area 25, 1951 - 1983.

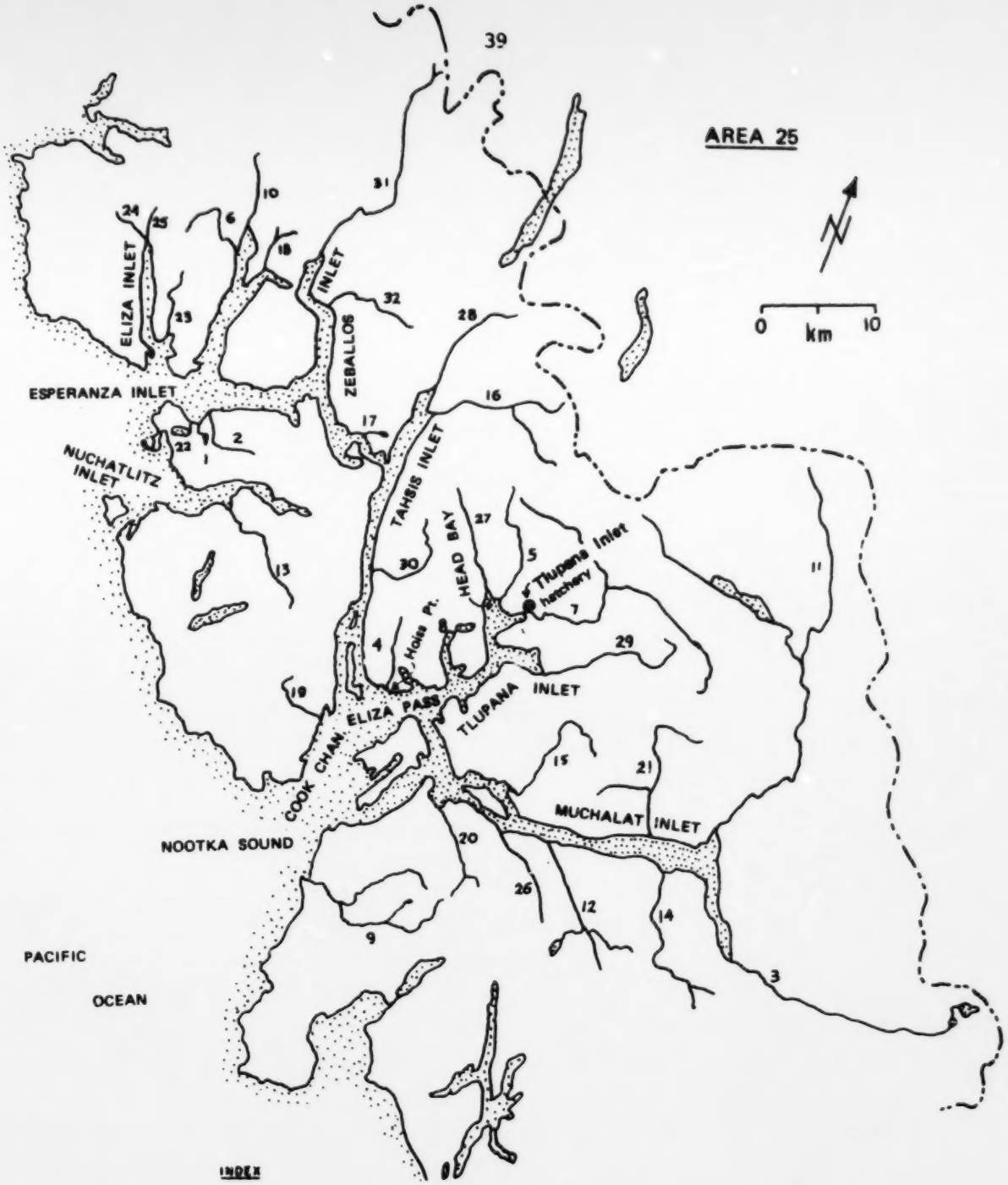
Table 25. Annual catch, escapement and total stock estimates for chum salmon in Area 25, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	300	95,100	95,400	53,900	1.77	149,300
1952	600	46,600	47,200	88,200	0.54	135,400
1953	5,100	206,700	211,800	133,000	1.59	344,800
1954	4,500	169,000	173,500	85,500	2.03	259,000
1955	8,700	49,500	58,200	31,700	1.84	89,900
1956	3,500	84,800	88,300	70,100	1.26	158,400
1957	8,100	69,600	77,700	44,400	1.75	122,100
1958	29,200	86,000	115,200	103,400	1.11	218,600
1959	24,400	53,100	77,500	73,600	1.05	151,100
1960	50,000	53,100	103,100	293,900	0.35	397,000
1961	35,600	43,300	78,900	108,000	0.73	186,900
1962	23,200	19,000	42,200	80,900	0.52	123,100
1963	22,400	32,600	55,000	104,100	0.53	159,100
1964	8,800	36,700	45,500	123,700	0.37	169,200
1965	0[c]	0	0	58,700	-	58,700
1966	0	0	0	109,800	-	109,800
1967	0	0	0	88,200	-	88,200
1968	0	0	0	87,400	-	87,400
1969	0	3,200	3,200	89,100	0.04	92,300
1970	12,600	90,700	103,300	132,200	0.78	235,500
1971	22,000	42,800	64,800	69,200	0.94	134,000
1972	48,600	55,100	103,700	141,900	0.73	245,600
1973	52,100	89,300	141,400	185,200	0.76	326,600
1974	60,700	102,200	162,900	100,100	1.63	263,000
1975	33,300	30,100	63,400	66,100	0.96	129,500
1976	12,000	6,600	18,600	36,400	0.51	55,000
1977	500	1,700	2,200	55,100	0.04	57,300
1978	1,400	3,900	5,300	116,000	0.05	121,300
1979	0	0	0	40,800	-	40,800
1980	66,900	140,100	207,000	125,800	1.65	332,800
1981	18,000	23,300	41,300	117,200	0.35	158,500
1982	103,900	155,300	259,200	165,400	1.57	424,600
1983	35,800	77,100	112,900	161,100	0.70	274,000

[a] Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b] Catch and escapement numbers rounded to the nearest hundred.

[c] Zero catch indicates closed fishery or negligible catch, (< 50 pieces).



INDEX

1	APPLE CREEK	12	HOUSTON RIVER	23	PARK RIVER
2	BRODICK CREEK	13	INNER BASIN RIVER (LAURIE CR.)	24	PORT ELIZA No 1
3	BURMAN RIVER	14	JACKLAN CREEK	25	PORT ELIZA No 2
4	CANAL CREEK (HOISS)	15	KLEEPTEE CREEK	26	SILVERADO CREEK
5	CANTON GORGE CREEK	16	LEINER CREEK	27	SUCWOA RIVER
6	CHUM CREEK	17	LORD CREEK	28	TAHSIS RIVER
7	CORUMA CREEK	18	MAHAT CREEK	29	TLUPANA RIVER
8	DESERTED CREEK	19	MARVINAS BAY CREEK	30	TAOWWIN RIVER (TSOWWIN)
9	ESCALANTE RIVER	20	MOOYAH BAY CREEK	31	ZEBALLOS RIVER
10	ESPINOSA RIVER	21	McCURDY CREEK	32	ZEBALLOS (LITTLE) RIVER
11	GOLD RIVER	22	OWOSSITSA CREEK		

Fig. 14. Location of salmon spawning streams in Area 25.

Table 26. Escapement levels for major chum producing streams in Area 25.

Stream	Maximum escapement since 1951	Mean escapement (1973 - 1982)
Conuma River	40,000	12,900
Inner Basin Rivers	35,000	5,700
Tahsis River	35,000	11,300
Zeballos River	15,000	7,000
Area 25 Total	293,900	100,800

Table 27. Age breakdown of chum salmon catches in Area 25, 1959-1982.

YEAR	Catch	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	77,500	46,345	59.8	1956	30,690	39.6	1955	465	0.6	1954
1960	103,100	83,511	81.0	1957	19,589	19.0	1956	0	0.0	1955
1961	78,900	20,435	25.9	1958	57,597	73.0	1957	789	1.0	1956
1962	42,200	18,146	43.0	1959	23,379	55.4	1958	506	1.2	1957
1963	55,000	39,105	71.1	1960	15,290	27.8	1959	605	1.1	1958
1964	45,500	14,879	32.7	1961	30,622	67.3	1960	0	0.0	1959
1965	0	-	-		-	-		-	-	
1966	0	-	-		-	-		-	-	
1967	0	-	-		-	-		-	-	
1968	0	-	-		-	-		-	-	
1969	3,200	1,866	58.3	1966	1,334	41.7	1965	0	0.0	1964
1970	103,300	32,953	31.9	1967	70,347	68.1	1966	0	0.0	1965
1971	64,800	22,615	34.9	1968	37,584	58.0	1967	4,601	7.1	1966
1972	103,700	9,748	9.4	1969	91,775	88.5	1968	2,178	2.1	1967
1973	141,400	20,220	14.3	1970	95,445	67.5	1969	25,593	18.1	1968
1974	162,900	42,517	26.1	1971	96,926	59.5	1970	23,458	14.4	1969
1975	63,400	8,686	13.7	1972	51,100	80.6	1971	3,614	5.7	1970
1976	18,600	4,948	26.6	1973	13,001	69.9	1972	651	3.5	1971
1977	2,200	1,212	55.1	1974	939	42.7	1973	48	2.2	1972
1978	5,300	578	10.9	1975	4,653	87.8	1974	69	1.3	1973
1979	0	-	-		-	-		-	-	
1980	207,000	164,979	79.7	1977	40,572	19.6	1976	1,242	0.6	1975
1981	41,300	2,767	6.7	1978	37,996	92.0	1977	537	1.3	1976
1982	259,200	23,587	9.1	1979	224,986	86.8	1978	10,627	4.1	1977

Table 28. Age breakdown of chum salmon escapements in Area 25, 1959-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	73,600	44,013	59.8	1956	29,146	39.6	1955	442	0.6	1954
1960	293,900	238,059	81.0	1957	55,841	19.0	1956	0	0.0	1955
1961	108,000	27,972	25.9	1958	78,840	73.0	1957	1,080	1.0	1956
1962	80,900	34,787	43.0	1959	44,819	55.4	1958	971	1.2	1957
1963	104,100	74,015	71.1	1960	28,940	27.8	1959	1,145	1.1	1958
1964	123,700	40,450	32.7	1961	83,250	67.3	1960	0	0.0	1959
1965	58,700	-	-		-	-		-	-	
1966	109,800	-	-		-	-		-	-	
1967	88,200	-	-		-	-		-	-	
1968	87,400	-	-		-	-		-	-	
1969	89,100	51,945	58.3	1966	37,155	41.7	1965	0	0.0	1964
1970	132,200	42,172	31.9	1967	90,028	68.1	1966	0	0.0	1965
1971	69,200	24,151	34.9	1968	40,136	58.0	1967	4,913	7.1	1966
1972	141,900	13,339	9.4	1969	125,582	88.5	1968	2,980	2.1	1967
1973	185,200	26,484	14.3	1970	125,010	67.5	1969	33,521	18.1	1968
1974	100,100	26,126	26.1	1971	59,560	59.5	1970	14,414	14.4	1969
1975	66,100	9,056	13.7	1972	53,277	80.6	1971	3,768	5.7	1970
1976	36,400	9,682	26.6	1973	25,444	69.9	1972	1,274	3.5	1971
1977	55,100	30,360	55.1	1974	23,528	42.7	1973	1,212	2.2	1972
1978	116,000	12,644	10.9	1975	101,848	87.8	1974	1,508	1.3	1973
1979	40,800	25,418	62.3	1976	11,710	28.7	1975	3,672	9.0	1974
1980	125,800	100,263	79.7	1977	24,657	19.6	1976	755	0.6	1975
1981	117,200	7,852	6.7	1978	107,824	92.0	1977	1,524	1.3	1976
1982	165,400	15,051	9.1	1979	143,567	86.8	1978	6,781	4.1	1977

Table 29. Brood year summaries and rates of return for chum salmon in Area 26, 1956 - 1979.

BROOD		Age 3 Return				Age 4 Return				Age 5 Return				All Ages	
YEAR	Escapement	Year of Return	Catch	Escapement	Age 3 Rtn Ttl Rtn	Year of Return	Catch	Escapement	Age 4 Rtn Ttl Rtn	Year of Return	Catch	Escapement	Age 5 Rtn Ttl Rtn	Total Return	Ttl Rtn / Escapement
1956	70,100	1959	46,345	44,013	0.54	1960	19,589	55,841	0.45	1961	789	1,080	0.01	167,657	2.39
1957	44,400	1960	83,511	238,059	0.70	1961	57,597	78,840	0.50	1962	506	971	.00	459,484	10.35
1958	103,400	1961	20,435	27,972	0.41	1962	23,379	44,819	0.58	1963	606	1,145	0.01	118,355	1.14
1959	73,600	1962	18,146	34,787	0.54	1963	15,290	28,940	0.46	1964	0	0	0.00	97,165	1.32
1960	293,900	1963	39,105	74,015	0.50[a]	1964	50,622	83,250	0.50[a]	1965	-	-	-	226,992	0.77[a]
1961	108,000	1964	14,879	40,450	1.00[a]	1965	-	-	-	1966	-	-	-	55,328	0.51[a]
1962	80,900	1965	-	-	-	1966	-	-	-	1967	-	-	-	-	-
1963	104,100	1966	-	-	-	1967	-	-	-	1968	-	-	-	-	-
1964	123,700	1967	-	-	-	1968	-	-	-	1969	0	0	0.00[a]	-	-
1965	58,700	1968	-	-	-	1969	1,334	57,155	1.00[a]	1970	0	0	0.00[a]	58,489	0.66[a]
1966	109,800	1969	1,866	51,945	0.24	1970	70,347	90,039	0.72	1971	4,601	4,913	0.04	223,700	2.04
1967	88,200	1970	32,953	42,172	0.48	1971	57,584	40,156	0.49	1972	2,178	2,980	0.03	158,002	1.79
1968	87,400	1971	22,615	24,151	0.14	1972	91,775	135,582	0.67	1973	25,593	33,521	0.18	323,237	3.70
1969	89,100	1972	9,748	13,339	0.08	1973	95,445	135,010	0.78	1974	23,458	14,414	0.13	281,413	3.16
1970	132,200	1973	20,229	26,484	0.22	1974	96,926	99,560	0.74	1975	5,614	3,768	0.04	210,570	1.59
1971	69,200	1974	42,517	26,126	0.59	1975	51,100	53,277	0.60	1976	651	1,274	0.01	174,945	2.53
1972	141,900	1975	8,686	9,036	0.31	1976	13,001	25,444	0.67	1977	48	1,212	0.02	57,447	0.40
1973	188,200	1976	4,948	9,682	0.36	1977	959	23,538	0.60	1978	69	1,508	0.04	40,674	0.22
1974	100,100	1977	1,212	30,360	0.22	1978	4,653	101,848	0.75	1979	0	3,672	0.03	141,746	1.42
1975	66,100	1978	578	12,644	0.49	1979	0	11,710	0.43	1980	1,242	755	0.07	26,928	0.41
1976	36,400	1979	0	25,418	0.27	1980	40,572	24,657	0.70	1981	557	1,524	0.02	92,708	2.55
1977	55,100	1980	164,979	100,263	0.62	1981	37,996	107,824	0.34	1982	10,627	6,781	0.04	438,470	7.78
1978	116,000	1981	2,767	7,892	0.03[a]	1982	224,986	145,567	0.97[a]	1983	-	-	-	379,172	3.27[a]
1979	40,800	1982	23,587	15,051	1.00[a]	1983	-	-	-	1984	-	-	-	38,699	0.95[a]
Mean[b]					0.38				0.58				0.04		2.67
S.D.					0.17				0.15				0.05		2.63

[a] Incomplete.
[b] Mean of annual values, incomplete years included.

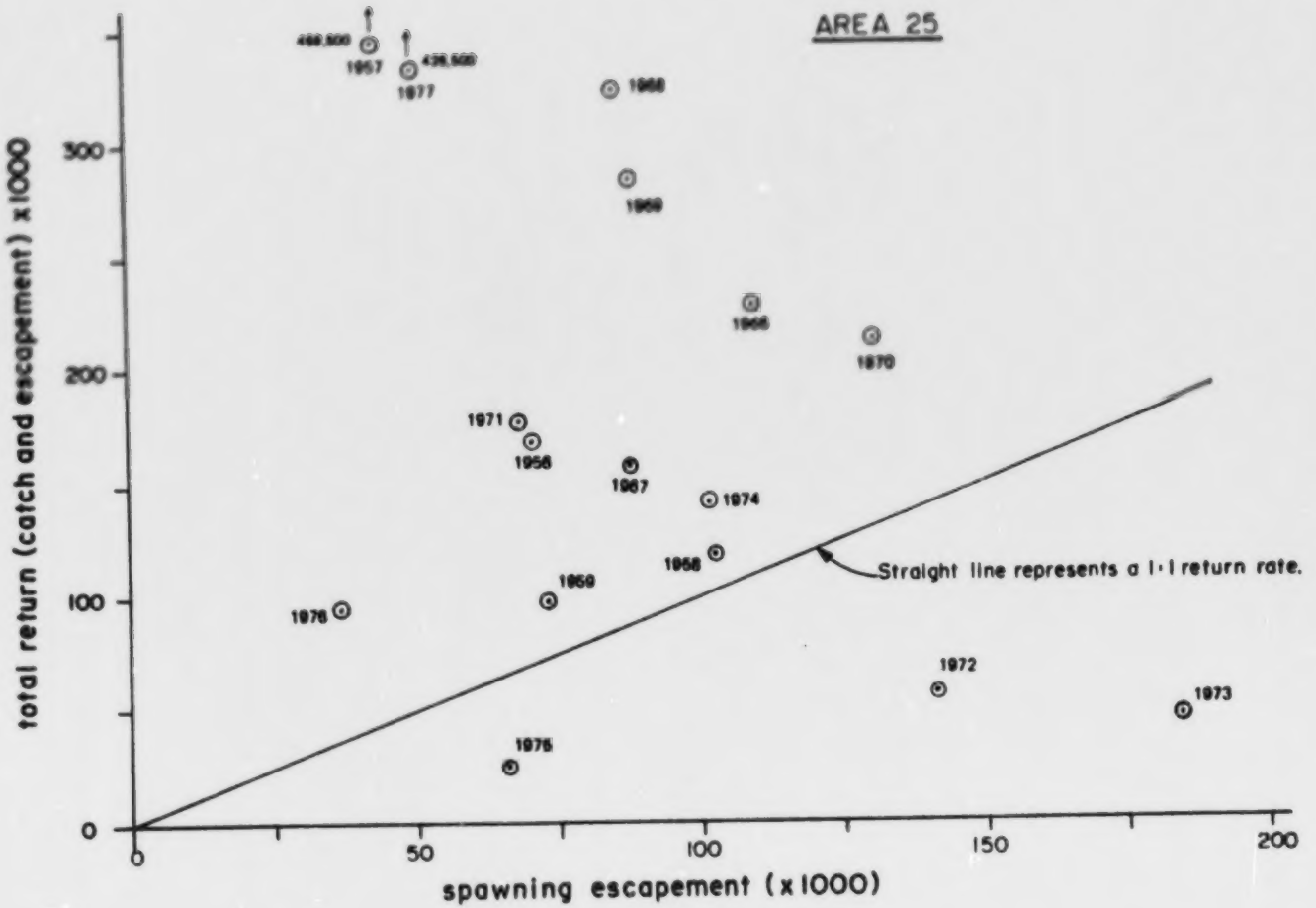


Fig. 15. Relationship between total returns and spawning escapements for chum salmon in Area 25, 1956 - 1977 brood years.

escapement used for chum management in this area over the past years has been 100,000 fish and the rates of return seem to support this figure. Area 25 generally showed good return rates except for the 1972, 1973 and 1975 broods. Poor return from the 1975 brood suggests stock damage from floods which occurred during the early incubation of that brood.

TEST FISHING

Test fishing was conducted in Area 25 each fall during 1977 to 1980 using a 15.2 cm (6") regulation length gillnet. The results are summarized by week in Figure 16 and Table 30 (see also Appendix 4). The test fishery catches showed no significant correlation ($p < 0.05$) with the total stock size, although many of the 'r' values approached the critical value of 1.00 (Table 31). Additional years of data and increased fishing effort are required to clarify the above relationship.

Until the present time, a single test fishing boat has serviced both Areas 25 and 26. Due to the great travelling distances involved, both zones have been covered inadequately. Yet, data collection on Area 25 chum stocks is considered essential due to the important and consistent production from this region. The test fishery results become even more important with the first major chum returns to the Tlupana Inlet enhancement facility in 1983 (see section below). Therefore, it is suggested that in the future, a full-time test fishing boat be operated in Area 25 in order to provide an adequate data base for successful management of this fishery.

TLUPANA INLET ENHANCEMENT FACILITY

Tlupana Inlet hatchery is located near the mouth of the Conuma River (Fig. 14). Chum eggs were first incubated there in 1978 and chinook eggs in 1979. The production goal for chum salmon was 23 million eggs yielding 16,560,000 fry at release and 331,000 returning adults (T. Perry, DFO, pers. comm.). Brood stock is taken from five streams (Canton, Conuma, Deserted, Sucwoa and Tlupana; Fig. 14) by seining off the creek mouths or beach seining in the streams. Eggs are incubated in a Japanese-style hatchery and fry reared to 1 to 2 grams.

Hatchery production for the 1978 to 1982 broods is summarized in Table 32. Maximum production was achieved in 1983 when approximately 19 million chum fry were released. Predicted adult returns from hatchery operation are given in Table 33 and are based on similar assumptions as given for the Nitinat hatchery production (see section above). Assuming an average return of wild stocks, a harvestable surplus of hatchery fish is expected by 1985, leaving 150,000 chum for escapement and 15,000 for hatchery stock.

AREA 26 (KYUQUOT SOUND)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 26 chum salmon for the period 1951 to 1983 are shown in Figure 17 and Table 34. The chum stocks in Area 26 have been fished in 23 of the above 33 years with an extended fishery closure implemented during the 1960's. Total area escapements between 1951 and 1983 have ranged from 10,700 in 1963 to 109,800 in 1958. The estimated optimum escapement for the area of 120,000 chum has not been reached since 1951, although total stock has surpassed this value on 10 occassions. The catch and

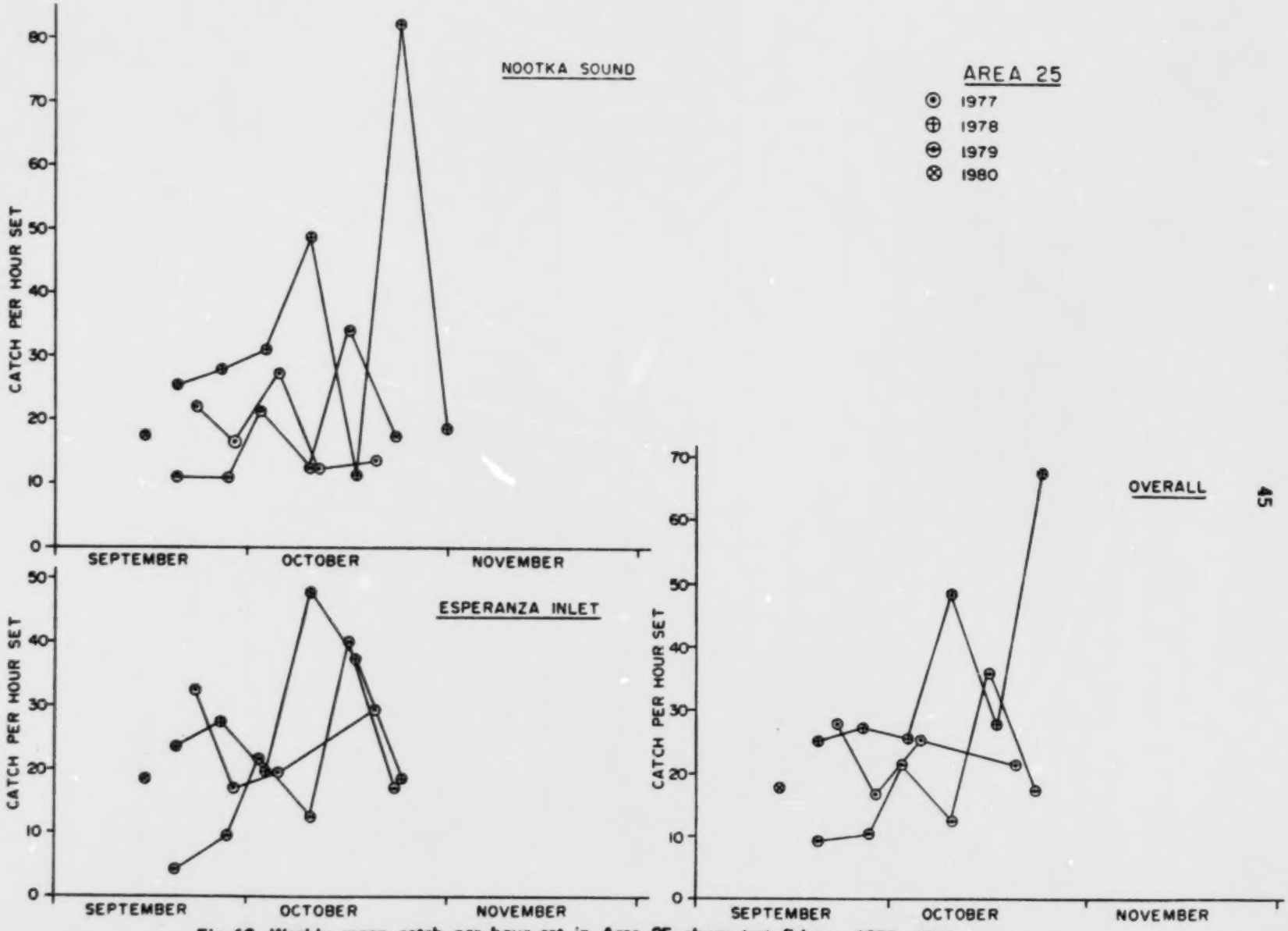


Fig. 16. Weekly mean catch per hour set in Area 25 chum test fishery, 1977 - 1980.

Table 30. Weekly mean catch per hour set in Area 25 chum test fishery, 1977-1980.

Week No.	Date	Mean catch/hr					No. Sets
		Nootka	Esperanza	Combined[a]	Mary Basin	Overall[a]	
1977							
B	Sept. 21-24	22.2	32.5	27.9	-	-	9
C	Sept. 24-Oct. 1	16.4	17.0	16.7	-	-	15
D	Oct. 2-Oct. 8	27.4	19.7	25.2	7.5	23.0	8
E	Oct. 9, 11&12	12.4	-	-	-	-	4
F	Oct. 18-23	13.8	29.9	21.6	-	-	10
1978							
A	Sept. 17-21	25.6	23.5	25.2	5.0	24.2	20
B	Sept. 24-28	28.0	27.5	27.8	-	-	11
C	Oct. 2-4	31.1	19.7	25.4	-	-	8
D	Oct. 9-12	48.9	48.0	48.6	-	-	5
E	Oct. 15-19	11.4	37.7	27.8	-	-	16
F	Oct. 22-26	83.9	18.7	67.6	-	-	8
G	Oct. 29-Nov. 2	18.9	-	-	-	-	7
1979							
A	Sept. 17-21	11.0	4.2	9.3	-	-	23
B	Sept. 26-28	11.0	9.5	10.5	-	-	16
C	Oct. 1-4	21.4	21.8	21.5	52.5	27.7	15
D	Oct. 9-11	12.6	12.4	12.5	42.2	23.3	8
E	Oct. 15-18	34.3	40.2	35.9	83.6	46.1	14
F	Oct. 22-25	17.5	17.2	17.3	-	-	4
1980							
A	Sept. 13-18	17.5	18.3	17.7	-	-	16
B	Sept. 21	-	114.4	-	-	-	2

[a] Total overall catch ÷ total sets.

Table 31. Mean catch per hour in Area 25 chum test fishery related to total chum stock in that area, 1977-1979 (r=correlation coefficient)[a].

Period examined (week code)[b]	Year	Mean catch/hr a) Nootka	b) Esperanza	Combined (a) + (b)	Total stock estimate	Critical r value (95% CL)
Week B-D	1977	22.0	23.1	23.3	57,300	
	1978	36.0	31.7	33.9	121,300	
	1979	15.0	14.6	14.8	40,800	
	r	0.99	0.95	0.97		1.00
Week Up to C	1977	19.3	24.8	22.3	57,300	
	1978	28.2	23.6	26.1	121,300	
	1979	14.5	11.8	13.8	40,800	
	r	0.99	0.59	0.85		1.00
Overall	1977	18.4	24.8	22.9	57,300	
	1978	35.4	29.2	37.1	121,300	
	1979	18.0	17.6	17.8	40,800	
	r	0.98	0.89	1.00		1.00

[a] 1980 data omitted from analysis due to limited test fishery data.
[b] See Table 30.

Table 32. Tlupana Inlet chum hatchery production, 1978-1982 broods.

Brood year	No. females used	No. eggs taken	No. fry released
1978	-	995,600	851,000
1979	1,720	4,112,000	2,616,900
1980	4,490	12,812,000	8,942,100
1981	6,740	14,625,000	12,606,000
1982	9,800	20,750,000	18,795,400

Table 33. Predicted annual returns of Tlupana Inlet hatchery chum salmon from 1978-1982 broods.

Brood year	Total adult production	Expected returns in					
		1981	1982	1983	1984	1985	1986
1978	17,000	6,800	10,200	-	-	-	-
1979	52,300	-	20,900	31,400	-	-	-
1980	178,800	-	-	71,500	107,300	-	-
1981	252,100	-	-	-	100,300	151,300	-
1982	375,900	-	-	-	-	150,400	225,500
Total	876,100	6,800	31,100	102,900	208,100	301,700	225,500

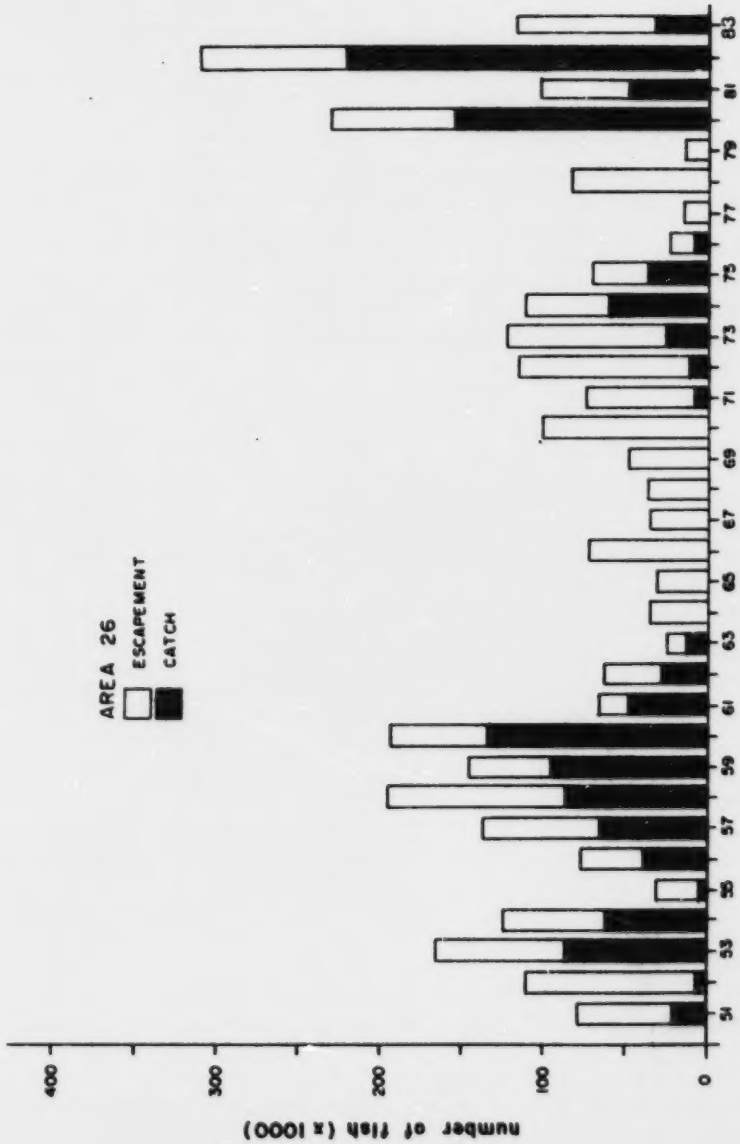


Fig. 17. Annual catch and escapement estimates for chum salmon in Area 26, 1951 - 1983.

Table 34. Annual catch, escapement and total stock estimates for chum salmon in Area 26, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	400	23,400	23,800	56,900	0.42	80,700
1952	0[c]	6,900	6,900	104,200	0.07	111,100
1953	0	87,300	87,300	77,400	1.13	164,700
1954	0	62,600	62,600	63,700	0.98	126,300
1955	0	5,500	5,500	26,100	0.21	31,600
1956	300	38,800	39,100	39,200	1.00	78,300
1957	800	65,700	66,500	74,400	0.89	140,900
1958	2,800	84,500	87,300	109,800	0.80	197,100
1959	2,200	91,300	93,500	53,700	1.74	147,200
1960	15,900	115,000	130,900	62,600	2.09	193,500
1961	19,900	28,400	48,300	20,400	2.37	68,700
1962	15,300	13,300	28,600	35,800	0.80	64,400
1963	8,700	5,800	14,500	10,700	1.36	25,200
1964	0	0	0	36,300	-	36,300
1965	0	0	0	31,300	-	31,300
1966	0	0	0	73,500	-	73,500
1967	0	0	0	35,200	-	35,200
1968	0	0	0	38,000	-	38,000
1969	0	0	0	46,100	-	46,100
1970	0	0	0	108,300	-	108,300
1971	4,200	3,400	7,600	67,700	0.11	75,300
1972	8,300	3,100	11,400	106,400	0.11	117,800
1973	14,100	10,500	24,600	99,900	0.25	124,500
1974	26,600	34,700	61,300	53,600	1.14	114,900
1975	11,700	26,300	38,000	33,500	1.13	71,500
1976	1,400	7,200	8,600	14,000	0.61	22,600
1977	0	0	0	16,600	-	16,600
1978	1,000	0	1,000	84,500	0.01	85,500
1979	0	0	0	14,700	-	14,700
1980	23,800	136,800	160,600	74,000	2.17	234,600
1981	13,900	36,600	50,500	50,000	1.01	100,500
1982	22,600	201,400	224,000	91,200	2.46	315,200
1983	5,900	30,200	36,100	86,200	0.42	122,300

[a] Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b] Catch and escapement numbers rounded to the nearest hunred.

[c] Zero catch indicates closed fishery or negligible catch, (< 50 pieces).

escapement data also indicate that Area 26 chum have been overfished on several occasions.

Historical chum escapement estimates for individual streams in Area 26 (Fig. 18) are shown in Appendix 2e. This area has relatively few streams and individual escapement estimates rarely exceed 10,000 chum. The main chum producers have included Chamiss and Clanninick Creeks and Kauwinch, Malksope and Tashish Rivers; together they contributed 57% to the total chum escapement to Area 26 during 1973 to 1982 (Table 35).

The age composition data available for Area 26 chum are shown in Appendix 3. Age data for Area 26 were not obtained in 1981, and were derived using the overall WCVI age composition that year as the best available estimate. The age data were applied to catch and escapement totals (Tables 36 and 37 respectively) and the rates of return for each brood year were calculated (Table 38). The rates of return, calculated since the 1956 brood year, averaged 3.38:1 and ranged from 0.08:1 for 1973 brood to 17.02:1 for 1977 brood. The proportions of fish returning at ages 3, 4 and 5 averaged 0.40, 0.58 and 0.02 respectively (Table 38). The total chum returns to Area 26 were plotted against the corresponding brood spawning escapements (Fig. 19). The data indicated that an optimum escapement for this area would be less than the 120,000 chum presently used for management purposes.

TEST FISHING

Test fishing was conducted in Area 26 each fall during 1977 to 1980 using a 15.2 cm (6") regulation length gillnet. The results are summarized by week in Figure 20 and Table 39 (see also Appendix 4). As with the other areas, the test catch data were inadequate for obtaining a significant correlation ($p < 0.05$) with the total stock (Table 40). However, the single calculated correlation coefficient suggests that a more intensive and regular test fishery may provide a potential tool for managing the chum stocks in Area 26.

AREA 27 (QUATSINO SOUND)

CATCHES, ESCAPEMENTS AND RATES OF RETURN

The catch and escapement estimates for Area 27 chum salmon for the period 1951 to 1983 are shown in Figure 21 and Table 41. The chum stocks in Area 27 have been fished in 28 of the above 33 years but no significant catches of the fall chum have occurred since 1960. The catch statistics show sporadic and substantial chum catches in Area 27 after 1960 but these catches were made in July and August just inside the surfline and do not represent fish returning to Area 27. There are a few minor runs of summer chum in the area but any catches of these would be insignificant.

Total escapements to Area 27 between 1951 and 1983 have ranged from 11,100 in 1962 to 94,300 in 1951 (Table 41). The estimated optimum escapement for this area of 100,000 chum has not been reached since 1951. A total stock of over 100,000 fish has been recorded on only three occassions and the average stock over the past 20 years has been only around 40,000 chum. Quatsino Sound is the most heavily industrialized zone in the area with extensive logging, mining and pulping operations. This extensive development may be related to the drastic declines of all salmon species observed in Area 27.

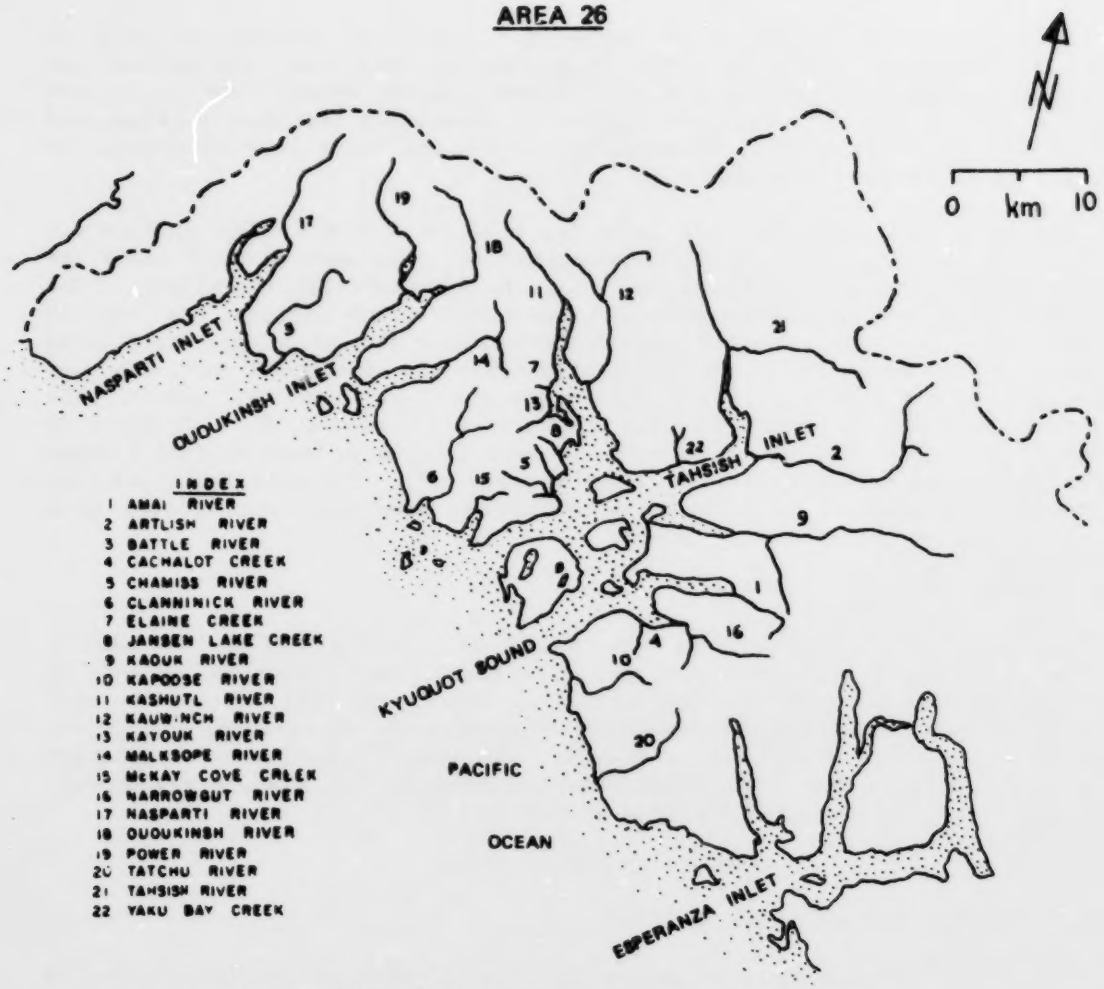


Fig. 18. Location of salmon spawning streams in Area 26.

Table 35. Escapement levels for major chum producing streams in Area 26.

Stream	Maximum escapement since 1951	Mean escapement (1973 - 1982)
Chamiss Creek	15,000	6,500
Clanninick Creek	35,000	4,400
Kauwinch River	25,000	5,400
Malksope River	35,000	6,500
Tahsish River	31,000	7,300
Area 26 Total	109,800	53,200

Table 36. Age breakdown of chum salmon catches in Area 26, 1959-1982.

YEAR	Catch	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	93,500	53,202	56.9	1956	38,242	40.9	1955	1,964	2.1	1954
1960	130,900	82,991	63.4	1957	46,993	35.9	1956	916	0.7	1955
1961	48,300	6,859	14.2	1958	41,007	84.9	1957	435	0.9	1956
1962	28,600	14,414	50.4	1959	13,785	48.2	1958	372	1.3	1957
1963	14,500	6,801	46.9	1960	7,540	52.0	1959	160	1.1	1958
1964	0	-	-		-	-		-	-	
1965	0	-	-		-	-		-	-	
1966	0	-	-		-	-		-	-	
1967	0	-	-		-	-		-	-	
1968	0	-	-		-	-		-	-	
1969	0	-	-		-	-		-	-	
1970	0	-	-		-	-		-	-	
1971	7,600	-	-		-	-		-	-	
1972	11,400	1,676	14.7	1969	9,496	83.3	1968	228	2.0	1967
1973	24,600	-	-		-	-		-	-	
1974	61,300	-	-		-	-		-	-	
1975	38,000	6,270	16.5	1972	26,372	69.4	1971	5,358	14.1	1970
1976	8,600	826	9.6	1973	7,224	84.0	1972	550	6.4	1971
1977	0	-	-		-	-		-	-	
1978	1,000	111	11.1	1975	887	88.7	1974	2	0.2	1973
1979	0	-	-		-	-		-	-	
1980	160,600	125,589	78.2	1977	34,208	21.3	1976	642	0.4	1975
1981	50,500	3,384	6.7	1978	46,460	92.0	1977	657	1.3	1976
1982	224,000	9,632	4.3	1979	209,664	93.6	1978	4,704	2.1	1977

Table 37. Age breakdown of chum salmon escapements in Area 26, 1959-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1959	53,700	30,555	56.9	1956	21,963	40.9	1955	1,128	2.1	1954
1960	62,600	39,688	63.4	1957	22,473	35.9	1956	438	0.7	1955
1961	20,400	2,897	14.2	1958	17,320	84.9	1957	184	0.9	1956
1962	35,800	18,043	50.4	1959	17,256	48.2	1958	465	1.3	1957
1963	10,700	5,018	46.9	1960	5,564	52.0	1959	118	1.1	1958
1964	36,300	-	-		-	-		-	-	
1965	31,300	-	-		-	-		-	-	
1966	73,500	-	-		-	-		-	-	
1967	35,200	-	-		-	-		-	-	
1968	38,000	-	-		-	-		-	-	
1969	46,100	-	-		-	-		-	-	
1970	108,300	-	-		-	-		-	-	
1971	67,700	-	-		-	-		-	-	
1972	106,400	15,641	14.7	1969	88,631	83.3	1968	2,128	2.0	1967
1973	99,900	-	-		-	-		-	-	
1974	53,600	-	-		-	-		-	-	
1975	33,500	5,528	16.5	1972	23,249	69.4	1971	4,724	14.1	1970
1976	14,000	1,344	9.6	1973	11,760	84.0	1972	896	6.4	1971
1977	16,600	10,707	64.5	1974	5,627	33.9	1973	266	1.6	1972
1978	84,500	9,380	11.1	1975	74,952	88.7	1974	169	0.2	1973
1979	14,700	7,644	52.0	1976	5,601	38.1	1975	1,455	9.9	1974
1980	74,000	57,868	78.2	1977	15,762	21.3	1976	296	0.4	1975
1981	50,000	3,350	6.7	1978	46,000	92.0	1977	650	1.3	1976
1982	91,200	3,922	4.3	1979	85,363	93.6	1978	1,915	2.1	1977

Table 38. Brood year summaries and rates of return for chum salmon in Area 26, 1956 - 1979.

BROOD		Age 3 Return				Age 4 Return				Age 5 Return				All Ages	
YEAR	Escapement	Year of Return	Catch	Escapement	Age 3 Rtn / Ttl Rtn	Year of Return	Catch	Escapement	Age 4 Rtn / Ttl Rtn	Year of Return	Catch	Escapement	Age 5 Rtn / Ttl Rtn	Total Return	Ttl Rtn / Escapement
1956	39,200	1959	53,202	30,555	0.54	1960	46,993	22,473	0.45	1961	435	184	.00	155,842	3.92
1957	74,400	1960	82,991	39,688	0.67	1961	41,007	17,330	0.32	1962	372	465	.00	181,845	2.44
1958	109,800	1961	6,859	2,847	0.24	1962	13,785	17,256	0.76	1963	160	118	0.01	41,073	0.37
1959	53,700	1962	14,414	18,043	0.71[a]	1963	7,540	5,564	0.29[a]	1964	-	-	-	45,562	0.85[a]
1960	62,600	1963	6,801	5,018	1.00[a]	1964	-	-	-	1965	-	-	-	11,819	0.19[a]
1961	20,400	1964	-	-	-	1965	-	-	-	1966	-	-	-	-	-
1962	35,800	1965	-	-	-	1966	-	-	-	1967	-	-	-	-	-
1963	10,700	1966	-	-	-	1967	-	-	-	1968	-	-	-	-	-
1964	36,300	1967	-	-	-	1968	-	-	-	1969	-	-	-	-	-
1965	31,300	1968	-	-	-	1969	-	-	-	1970	-	-	-	-	-
1966	73,500	1969	-	-	-	1970	-	-	-	1971	-	-	-	-	-
1967	35,200	1970	-	-	-	1971	-	-	-	1972	228	2,128	1.00[a]	2,356	0.07[a]
1968	38,000	1971	-	-	-	1972	9,496	88,631	1.00[a]	1973	0	0	0.00[a]	98,127	2.56[a]
1969	46,100	1972	1,676	15,641	1.00[a]	1973	0	0	0.00[a]	1974	0	0	0.00[a]	17,317	0.38[a]
1970	108,300	1973	-	-	-	1974	0	0	0.00[a]	1975	5,358	4,724	1.00[a]	10,082	0.09[a]
1971	67,700	1974	-	-	-	1975	26,372	23,249	0.97[a]	1976	550	896	0.03[a]	51,067	0.75[a]
1972	106,400	1975	6,770	5,538	0.58	1976	7,324	11,760	0.61	1977	0	266	0.01	31,047	0.29
1973	99,900	1976	826	1,344	0.27	1977	0	5,627	0.71	1978	2	169	0.02	7,968	0.08
1974	53,600	1977	0	10,707	0.12	1978	887	74,952	0.86	1979	0	1,455	0.02	88,001	1.64
1975	33,500	1978	111	9,380	0.59	1979	0	5,601	0.35	1980	642	296	0.04	16,050	0.48
1976	14,000	1979	0	7,644	0.13	1980	34,208	15,762	0.85	1981	657	650	0.04	58,930	4.21
1977	16,600	1980	125,589	57,868	0.65	1981	46,460	46,000	0.33	1982	4,704	1,915	0.04	282,516	17.02
1978	84,500	1981	3,384	3,350	0.02[a]	1982	209,664	85,363	0.98[a]	1983	-	-	-	301,761	3.57[a]
1979	14,700	1982	9,632	3,922	1.00[a]	1983	-	-	-	1984	-	-	-	13,554	0.92[a]
Mean[b]					0.40				0.58				0.02		3.58
S.D.					0.21				0.21				0.02		5.04

[a] Incomplete.
[b] Mean of annual values, incomplete years excluded.

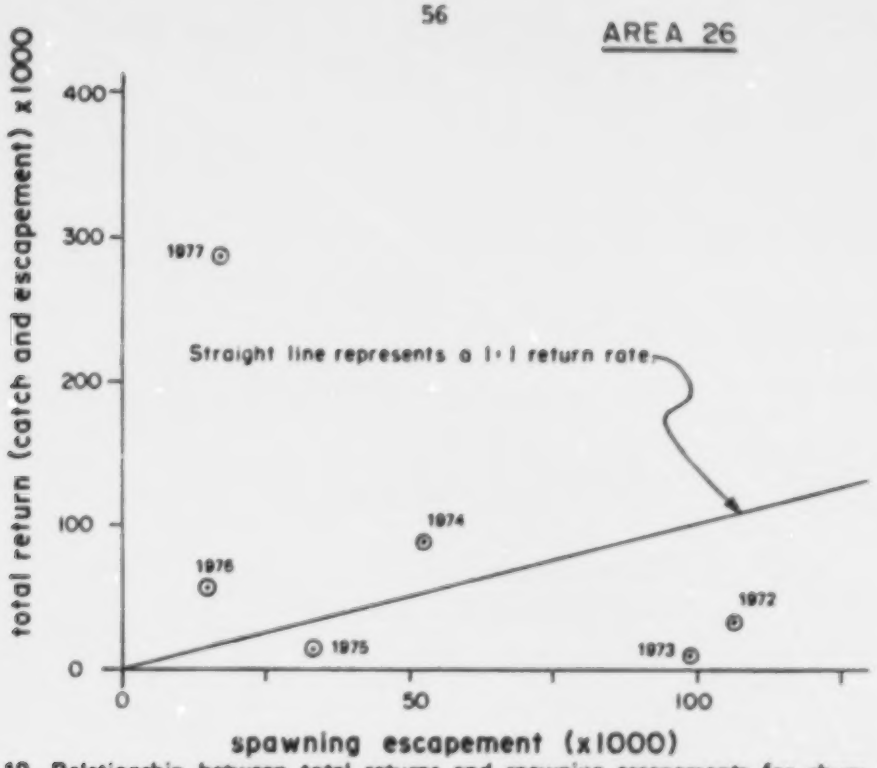


Fig. 19. Relationship between total returns and spawning escapements for chum salmon in Area 26, 1972 - 1977 brood years.

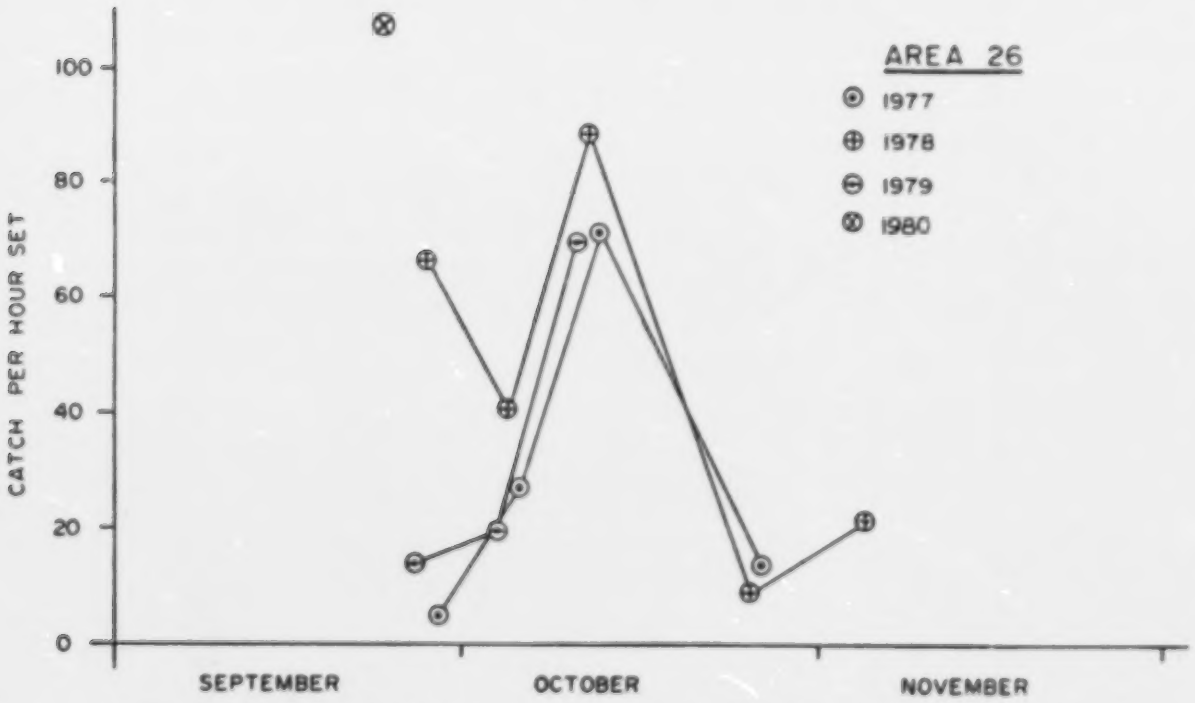


Fig. 20. Weekly mean catch per hour set in Area 26 chum test fishery, 1977 - 1980.

Table 39. Weekly mean catch per hour set in Area 26 chum test fishery, 1977-1980.

Week No.	Date	Mean catch/hr	No. sets
1977			
B	Sept. 25-Oct. 1	4.4	5
C	Oct. 2-8	27.0	9
D	Oct. 9-15	70.8	1
E	Oct. 16-22	-	0
F	Oct. 23-29	13.8	4
1978			
B	Sept. 24-30	66.3	3
C	Oct. 1-7	40.2	4
D	Oct. 8-14	88.3	2
E	Oct. 15-21	8.5	6
F	Oct. 22-28	21.1	4
1979			
B	Sept. 23-29	13.8	7
C	Sept. 30-Oct. 6	19.9	4
D	Oct. 7-13	69.7	3
1980			
B	Sept. 21-27	108.2	3

Table 40. Mean catch per hour in Area 26 chum test fishery related to total chum stock in that area, 1977-1979 (r=correlation coefficient)[a].

Period examined (week code)[b]	Year	Mean catch/hr Overall area	Total stock estimate	Critical r value (95% CL)
Week B-C	1977	15.7	16,600	
	1978	53.3	85,500	
	1979	16.9	14,700	
	r	1.00		1.00

[a] 1980 omitted from analysis due to limited test fishery data.
[b] See Table 39.

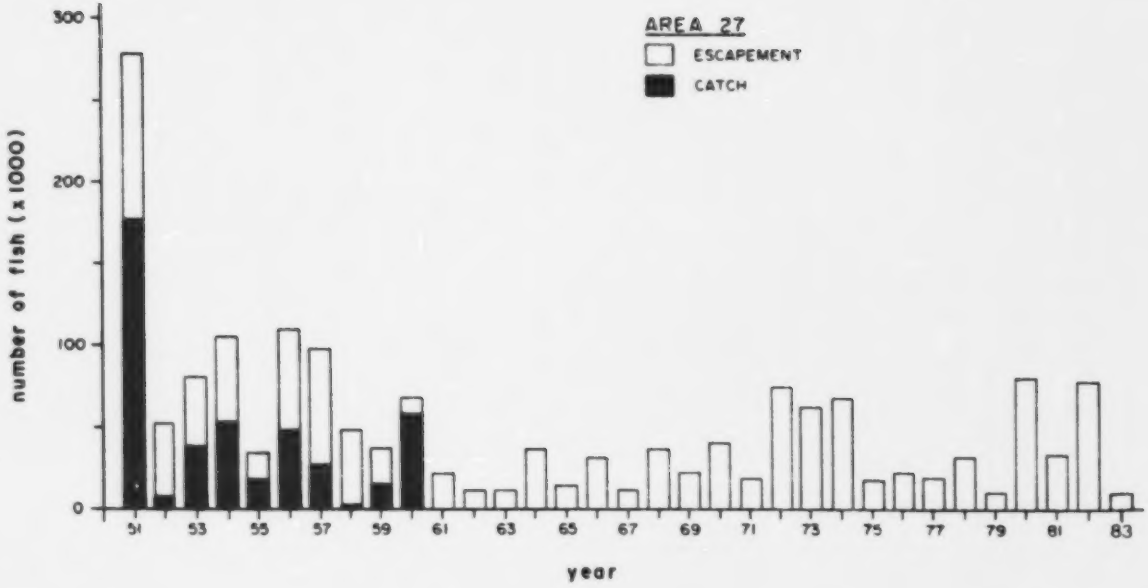


Fig. 21. Annual catch and escapement estimates for chum salmon in Area 27, 1951 - 1983.

Table 41. Annual catch, escapement and total stock estimates for chum salmon in Area 27, 1951-1983.[a,b]

YEAR	Catch (C)			Escapement (E)	C/E	Total Stock
	Gillnet	Seine	Total			
1951	9,100	167,100	176,200	94,300	1.87	270,500
1952	0[c]	7,500	7,500	45,700	0.16	53,200
1953	20,100	19,200	39,300	42,200	0.93	81,500
1954	18,400	35,000	53,400	51,900	1.03	105,300
1955	6,600	8,000	14,600	20,100	0.73	34,700
1956	3,100	45,600	48,700	61,100	0.80	109,800
1957	5,800	18,100	23,900	72,800	0.33	96,700
1958	0	1,800	1,800	47,600	0.04	49,400
1959	6,000	9,300	15,300	21,000	0.73	36,300
1960	21,400	36,900	58,300	11,700	4.98	70,000
1961	0	0	0	21,700	-	21,700
1962	0	0	0	11,100	-	11,100
1963	100	0	100[d]	12,100	0.01	12,100
1964	100	0	100[d]	38,800	.00	38,800
1965	300	0	300[d]	15,000	0.02	15,000
1966	1,100	0	1,100[d]	30,300	0.04	30,300
1967	400	0	400[d]	11,500	0.03	11,500
1968	2,400	0	2,400[d]	38,000	0.06	38,000
1969	500	0	500[d]	20,800	0.02	20,800
1970	3,300	0	3,300[d]	40,000	0.08	40,000
1971	1,800	0	1,800[d]	18,000	0.10	18,000
1972	4,600	0	4,600[d]	76,700	0.06	76,700
1973	9,700	2,100	11,800[d]	61,800	0.19	61,800
1974	5,000	0	5,000[d]	67,000	0.07	67,000
1975	24,300	1,900	26,200[d]	17,100	1.53	17,100
1976	12,800	4,500	17,300[d]	20,200	0.86	20,200
1977	4,500	4,300	8,800[d]	19,400	0.45	19,400
1978	500	0	500[d]	30,300	0.02	30,300
1979	100	300	400[d]	16,200	0.02	16,200
1980	0	0	0	79,700	-	79,700
1981	100	3,700	3,800[d]	30,900	0.12	30,900
1982	0	0	0	78,100	-	78,100
1983	0	0	0	12,000	-	12,000

[a] Data sources: catches from B.C. Catch Statistics; escapements from fishery officer's stream reports.

[b] Catch and escapement numbers rounded to the nearest hundred.

[c] Zero catch indicates closed fishery or negligible catch (< 50 pieces).

[d] Catches made after 1960 are included here but likely represent fish bound for other areas; therefore, they are not included in total stock estimates.

Historical chum escapement estimates for individual streams in Area 27 (Fig. 22) are shown in Appendix 2f. The area has a large number of streams with Cayeghle and Jim's Creeks as the major chum producers; together they contributed 27% to the total chum escapement to Area 27 during 1973 to 1982 (Table 42). Other consistent producers have been Colonial Creek, Denad Creek, Klaskish River, Klayina Creek and Koprino River. In the last five years, strong escapements were also observed in Johnny and Pegatten Creeks.

The age composition data available for Area 27 chum are shown in Appendix 3. Age data for Area 27 were not obtained in 1982, and were derived using the overall WCVI age composition for that year as the best available estimate (Area 22 was excluded from the 1982 overall age mean due to its unusually high age 5 component). The age data were applied to the escapement totals only (Table 43) since the limited catches probably represent stocks bound for other areas, and the rates of return for each brood year were calculated (Table 44). The rates of return, calculated since the 1974 brood year, averaged 1.81:1 and ranged from 0.31:1 for 1975 brood to 4.26:1 for 1977 brood. The proportions of fish returning at ages 3, 4 and 5 averaged 0.37, 0.60 and 0.30 respectively (Table 44). The total chum returns to Area 27 were plotted against the corresponding brood spawning escapements but the data were insufficient to isolate any trends (Fig. 23).

TEST FISHING

Test fishing was conducted in Area 27 each fall during 1977 to 1980 using a 15.6 cm (6 1/8") regulation length gillnet. The results are summarized by week in Figure 24 and Table 45 (see also Appendix 4). No significant correlation ($p<0.05$) was found between mean catch per hour and total stock for the four years sampled (Table 46). There was no obvious explanation for the relatively low test catches in 1980 despite relatively good total stock estimate of 79,700 chum (Table 41). Unlike other areas, many test sets made in Area 27 were of long duration (2-3 hours) and in the future one hour sets are recommended.

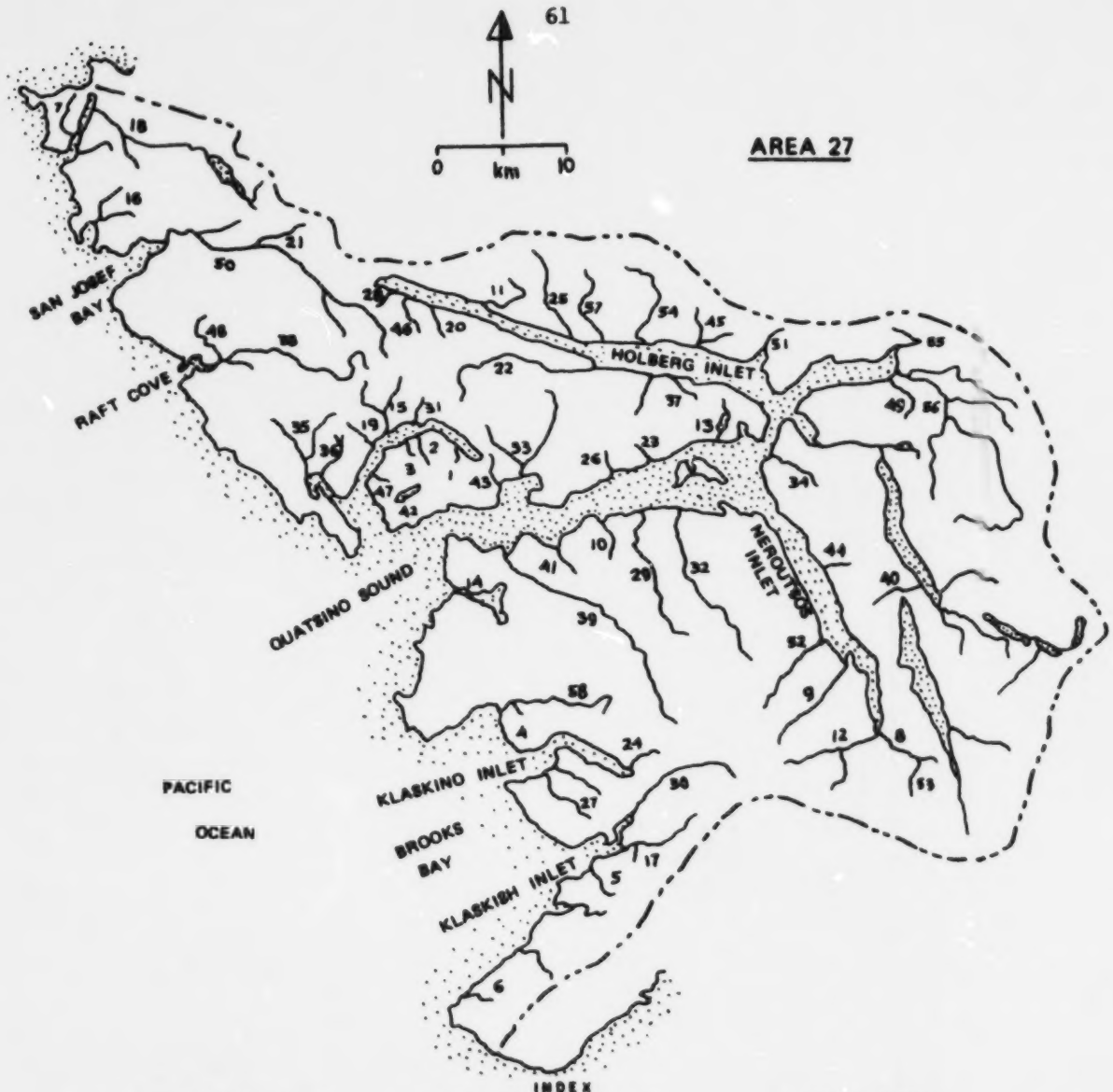
SUMMARY AND DISCUSSION OF BASIC STOCK DATA FOR AREAS 22-27

The purpose of this section is to combine and compare the basic stock information on escapement timing, catches and rates of return of chum salmon in Areas 22 to 27.

MIGRATION TIMING OF CHUM STOCKS

Data for determining migration timing of WCVI chum stocks entering into each Statistical Area are not available. However, an approximation can be developed by relating spawning timing to the timing of catch. In this report, mean spawning timing of chum in each area was based on the 1970 to 1982 spawning records given in the DFO spawning files. Only the major chum producing streams, which together contributed over 50% to each area's escapement during the 1970 to 1982 period, were considered.

Chum spawning timing by stream and area is shown in Figure 25 and Appendix 6. In all areas, chum arrived on the spawning grounds and started spawning usually during late September to mid-October. The exception was Area 25 where chum arrived about two weeks earlier. Spawning generally peaked in late



INDEX

1. AHWHICHAOLTO CREEK (UPPER)
2. AHWHICHAOLTO CREEK (LOWER)
3. BEAR CREEK
4. BUCK CREEK
5. CANOE CREEK
6. CAPE COOK CREEK
7. CAPE SCOTT CREEK
8. CLAYOHLE CREEK
9. CAYUSE CREEK
10. CLEAQH RIVER
11. CLEEKLAQH (6 MILE) CREEK
12. COLONIAL (MAIN) CREEK
13. COLONY CREEK
14. CULLEET CREEK
15. DENAD (GAATOI CREEK
16. DOMINIC CREEK
17. EAST CREEK
18. FISHERMAN RIVER
19. GALATO (DEVIL CLUB) CREEK
20. GLEERUP (3 MILE) CREEK
21. GOODSPEED (SPRUCE) CREEK
22. HATHAWAY (HALFWAY) CREEK
23. HAWISHAKWI CREEK
24. HEAD (MARY) RIVER
25. HUSHAMU (PEARSON) CREEK
26. ILSTAD CREEK
27. JIBB CREEK
28. JOHNNY CREEK
29. KEWQUODIE (JOHNSON) RIVER
30. KLASKISH RIVER
31. KLAVINA (TENAAD) CREEK
32. KLOOTCHLIMMIS (INGERSOL) RIVER
33. KOPRINO RIVER
34. KWAKWESTA (SAWMILL) CREEK
35. KWATLEO (BROWNING) CREEK
36. LEESON LAKE CREEK
37. LEWIS CREEK
38. MACJACK CREEK
39. MAHATTA RIVER
40. MARBLE RIVER
41. MONKEY CREEK
42. MONTGOMERY CREEK
43. McNIFFE (DUCK) CREEK
44. NEQUILTPAALIS CREEK
45. NUKNIMISH (APPLE) CREEK
46. PEGATTEN (2 MILE) CREEK
47. QUADNTIN CREEK
48. RONNING CREEK
49. RUPERT RIVER
50. SAN JOSEF RIVER
51. STEPHENS (COAL HARBOUR) CREEK
52. TEETA RIVER
53. UTLAN CREEK
54. WANOKANA (CRAWFORD) CREEK
55. WASHLAWLIS (LAGOON) CREEK
56. WAUKAAS (WAUKANAS) CREEK
57. YOUGHPAN (PRICE'S) CREEK
58. KEITH RIVER

Fig. 22. Location of salmon spawning streams in Area 27.

Table 42. Escapement levels for major chum producing streams in Area 27.

Stream	Maximum escapement since 1951	Mean escapement (1973-1982)
Cayeghle Creek	20,000	7,600
Jim's Creek	25,000	3,800
Area 27 Total	94,300	42,100

Table 43. Age breakdown of chum salmon escapements in Area 27, 1977-1982.

YEAR	Escapement	Age 3			Age 4			Age 5		
		No.	%	Brood Year	No.	%	Brood Year	No.	%	Brood Year
1977	19,400	11,077	57.1	1974	8,070	41.6	1973	252	1.3	1972
1978	30,300	1,576	5.2	1975	28,421	93.8	1974	303	1.0	1973
1979	16,200	12,458	76.9	1976	3,483	21.5	1975	259	1.6	1974
1980	79,700	50,769	63.7	1977	28,612	35.9	1976	319	0.4	1975
1981	30,900	2,750	8.9	1978	27,656	89.5	1977	494	1.6	1976
1982	78,100	11,403	14.6	1979	62,480	80.0	1978	4,217	5.4	1977

Table 44. Brood year summaries and rates of return for chum salmon in Area 27, 1974 - 1979.[a]

BROOD YEAR	Escapement	Age 3 Return: Year of Return	Catch	Escapement	Age 3 Rtn: Ttl Rtn	Age 4 Return: Year of Return	Catch	Escapement	Age 4 Rtn: Ttl Rtn	Age 5 Return: Year of Return	Catch	Escapement	Age 5 Rtn: Ttl Rtn	All Ages: Total Return	All Ages: Ttl Rtn / Escapement
1974	67,000	1977	0	11,077	0.28	1978	0	28,421	0.71	1979	0	259	0.01	39,758	0.59
1975	17,100	1978	0	1,576	0.29	1979	0	3,483	0.65	1980	0	319	0.06	5,377	0.31
1976	20,200	1979	0	12,458	0.30	1980	0	28,161	0.69	1981	0	494	0.01	41,565	2.06
1977	19,400	1980	0	50,769	0.61	1981	0	27,656	0.33	1982	0	4,217	0.05	82,642	4.26
1978	30,300	1981	0	2,750	0.04[b]	1982	0	62,480	0.96[b]	1983	-	-	-	65,230	2.15[b]
1979	16,200	1982	0	11,403	1.00[b]	1983	-	-	-	1984	-	-	-	11,403	0.70[b]
Mean[c]					0.37				0.60				0.03		1.81
S.D.					0.14				0.15				0.02		1.56

[a] Escapements only utilized since the catches probably represent stocks bound for other areas.
[b] Incomplete.
[c] Mean of annual values, incomplete years excluded.

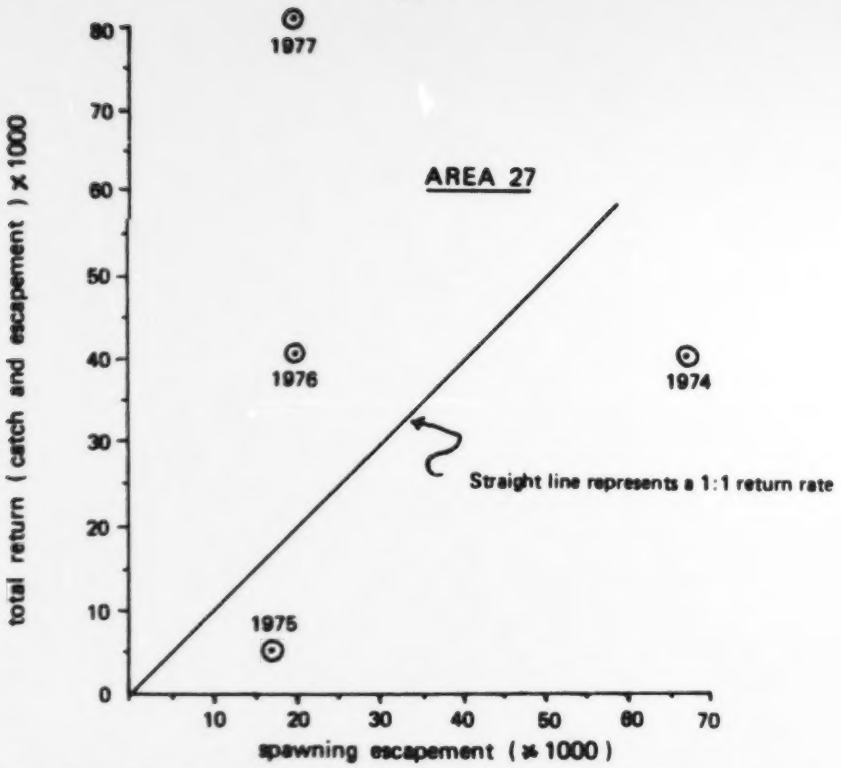


Fig. 23. Relationship between total returns and spawning escapements for chum salmon in Area 27, 1974 - 1977 brood years.

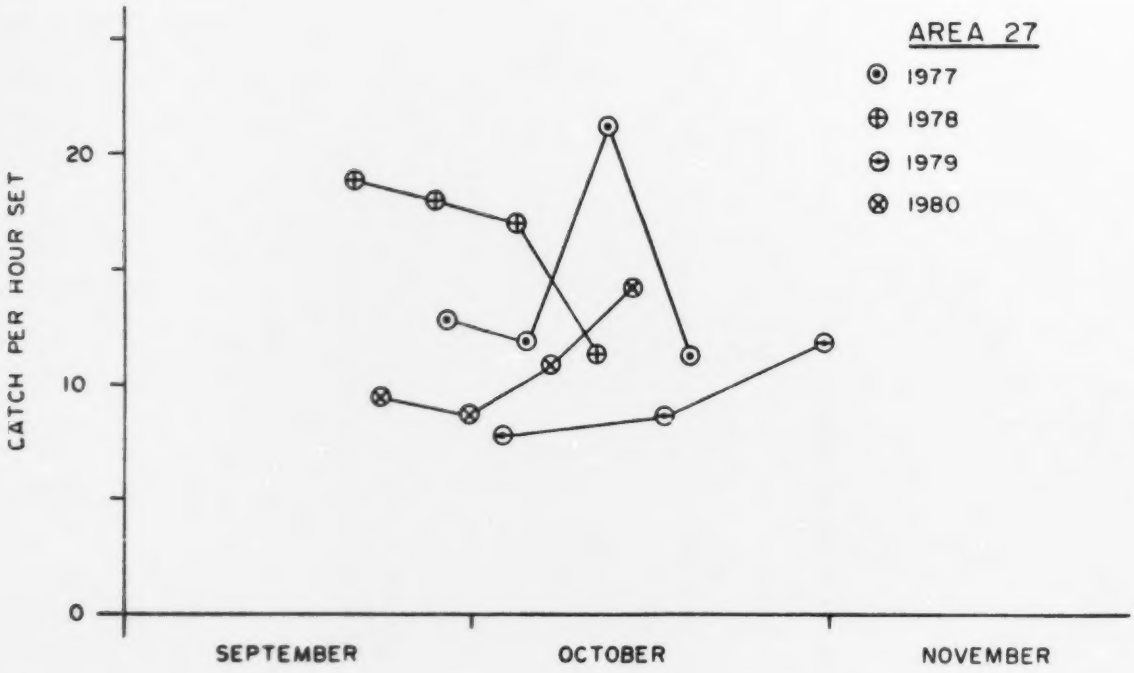


Fig. 24. Weekly mean catch per hour set in Area 27 chum test fishery, 1977 - 1980.

Table 45. Weekly mean catch per hour set in Area 27 chum test fishery, 1977-1980.

Week No.	Date	Mean catch/hr	No. sets
1977			
B	Sept. 25-Oct. 1	12.8	5
C	Oct. 2-8	11.9	8
D	Oct. 9-15	21.1	6
E	Oct. 16-22	11.2	8
1978			
A	Sept. 17-23	18.8	3
B	Sept. 24-30	17.9	5
C	Oct. 1-7	16.9	6
D	Oct. 8-14	11.3	9
1979			
C	Sept. 30-Oct. 6	7.7	17
D	-	-	-
E	Oct. 14-20	8.6	14
F	-	-	-
G	Oct. 28-Nov. 3	11.7	8
1980			
B	Sept. 21-27	9.5	15
C	Sept. 28-Oct. 4	8.6	12
D	Oct. 5-11	10.8	9
E	Oct. 12-18	14.2	6

Table 46. Mean catch per hour in Area 27 chum test fishery related to total chum stock in that area, 1977-1980 (r=correlation coefficient).

Period examined (week code)[a]	Year	Mean catch/hr Overall area	Total stock estimate	Critical r value (95% CL)
Week B-D	1977	15.3	19,400	
	1978	15.4	30,300	
	1979	7.7[b]	16,200	
	1980	9.6	79,700	
	r	-0.98		1.00
Week C-E	1977	14.7	19,400	
	1978	14.1	30,300	
	1979	8.2	16,200	
	1980	11.2	79,700	
	r	-0.06		0.95
Overall	1977	14.3	19,400	
	1978	16.2	30,300	
	1979	9.3	16,200	
	1980	10.8	79,700	
	r	-0.22		0.95

[a] See Table 45.

[b] Omitted from analysis due to limited test fishery data.

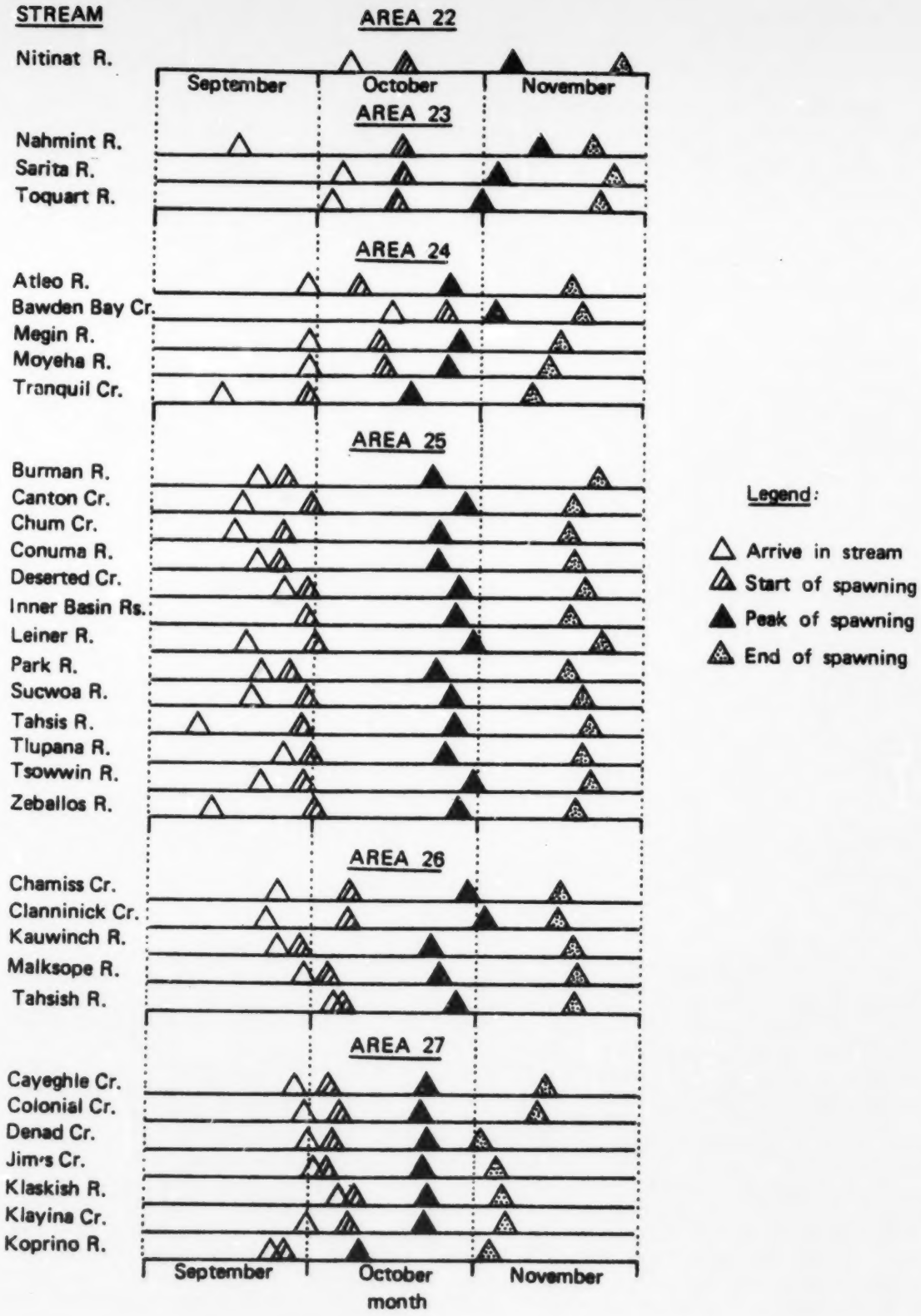


Fig. 25. Mean spawning timing of major WCVI chum salmon stocks in Areas 22 - 27, 1970 - 1982 data.

October and ended by mid-November. In Areas 22 and 23 spawning peaked in early November. The interval between chum arrival on the spawning grounds and the end of spawning generally lasted two months, but only about one month in Area 27.

Combined data on chum spawning timing and the timing of catch (see the following section) indicate that, compared to other WCVI areas, Area 25 has generally an early chum run, Areas 26 and 27 have intermediate runs, and Areas 22, 23 and 24 have late runs. The chum run is especially protracted in Area 24, as indicated by the extended arrival of chum salmon into the local streams (Fig. 25).

TIMING AND EFFORT OF CHUM NET FISHERIES

The timing of weekly gillnet and seine catches of chum salmon during 1970 to 1982 is shown by Statistical Area in Figure 26 and Appendix 7; both directed and incidental catches are shown. In all the areas, major chum net fisheries generally occurred in October, just after sufficient escapements have been reached in the local streams. The exception was Area 27 where an earlier and more extended fishery directed on mixed passing chum stocks and not on local stocks, was conducted from June to September. The somewhat earlier timing of the chum fishery in Area 25 compared to other WCVI areas (Fig. 26) is related to an earlier arrival of local stocks into that region (Fig. 25).

The net fishing effort directed at chum salmon, including days fished and fleet size, is summarized by area for the period 1970 to 1982 in Appendix 8. The effort data represent the best available information and incorporate both the DFO Area Histories and B.C. Catch Statistics. However, due to incomplete Area History records, the interpretation of the fleet size and fishing times was at times questionable. As a result, these data while as complete as possible, still should be used with caution. Reasons for the openings and closures, as outlined in the DFO Area Histories, were documented sporadically and poorly, and are not included here. Openings, when they occurred, usually lasted 48 hours, except in 1981 and 1982 when they were usually 24-hours long. Area 25 showed the greatest and most consistent yearly fishing effort, with up to 10 fishing days observed in 1973; Area 22 had the fewest fishing days during the 1970 to 1982 period.

CATCHES

Annual chum net catches for individual and combined Areas 22 to 27 are presented for the period 1951 to 1982 in Table 47. Period summaries show that the combined WCVI catches have declined from around 410,000 in the 1950's to around 250,000 in the 1970's (Fig. 27, Table 47). Between-area comparisons show significant catch trends (Fig. 28, Table 47). Area 22 (Nitinat Lake) had the greatest variability in annual catch which ranged from 3% to 87% of the total annual WCVI chum catch. Catch contribution from Area 23 (Barkley Sound) has declined considerably from around 30% in the 1950's to around 11% in the 1970's, while Area 24 (Clayoquot Sound) catch contribution has increased slightly in the last decade to 12% of the WCVI catch. Area 25 (Nootka Sound) has been the most consistent producer since 1951, averaging around 25% of the total WCVI chum catch. Area 26 (Kyuquot Sound) share has increased from around 14% in the 1950's to around 23% in the 1970's. The latter increase is probably due to greater fleet mobility and accessibility to Area 26, combined with restricted openings in other traditional fall fishing areas, such as the Fraser River and Johnstone Strait. Area 27 (Quatsino Sound) showed the lowest catch contribution

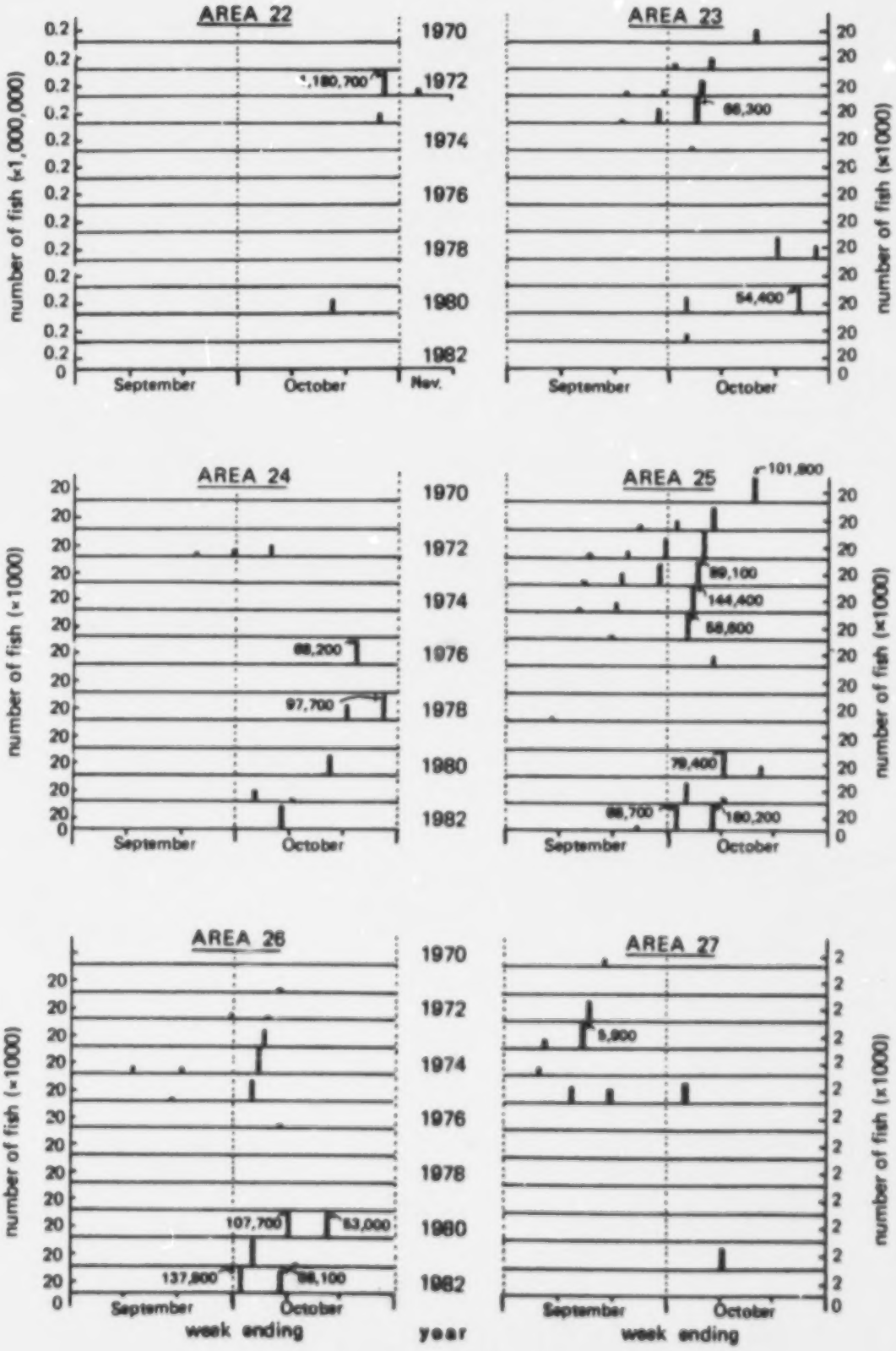


Fig. 26. Weekly net catches of chum salmon in Areas 22 - 27, 1970 - 1982.

Table 47. Annual chum salmon catches in Areas 22-27, expressed as percent of WCVI total chum catch, 1951 - 1982.

YEAR	Area 22	% of Total	Area 23	% of Total	Area 24	% of Total	Area 25	% of Total	Area 26	% of Total	Area 27 [a]	% of Total	Total Catch
1951	27,100	6.2	90,200	20.7	22,600	5.2	95,400	21.9	23,800	5.5	176,200	40.5	435,300
1952	-	-	45,100	37.6	13,400	11.2	47,200	39.3	6,900	5.7	7,500	6.2	120,100
1953	59,900	9.2	198,600	30.4	55,900	8.6	211,800	32.4	87,300	13.4	39,300	6.0	652,800
1954	217,200	23.7	315,700	34.4	95,900	10.4	173,500	18.9	62,600	6.8	53,400	5.8	918,300
1955	7,200	3.3	114,200	51.7	21,100	9.6	58,200	26.4	5,500	2.5	14,600	6.6	220,800
1956	118,300	19.5	257,300	42.5	53,500	8.8	88,500	14.6	39,100	6.5	48,700	8.0	605,200
1957	85,300	21.3	113,800	28.4	33,600	8.4	77,700	19.4	66,500	16.6	23,900	6.0	400,800
1958	205,800	38.2	103,700	19.3	24,400	4.5	115,200	21.4	87,300	16.2	1,800	0.3	538,200
1959	-	-	76,500	25.5	37,400	12.5	77,500	25.8	93,500	31.1	15,300	5.1	300,200
1960	48,200	10.9	71,000	16.1	28,800	6.5	103,100	23.4	130,900	29.7	58,300	13.2	440,300
1961	-	-	33,100	18.9	15,200	8.7	78,900	45.0	48,300	27.5	-	-	175,500
1962	-	-	37,500	29.9	17,500	13.8	42,200	33.6	28,600	22.8	-	-	125,600
Mean (1951-62)	64,083	15.6	121,392	29.5	34,925	8.5	97,417	23.7	56,692	13.8	36,583	8.9	411,092
Mean (omitting 0's)	96,125	23.4	121,392	29.5	34,925	8.5	97,417	23.7	56,692	13.8	43,900	10.7	411,092
1963	-	-	-	-	8,900	11.4	55,000	70.2	14,500	18.5	-	-	78,400
1964	-	-	-	-	-	-	45,500	100.0	-	-	-	-	45,500
1965	-	-	-	-	-	-	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	3,200	100.0	-	-	-	-	3,200
1970	-	-	20,400	16.5	-	-	103,300	83.5	-	-	-	-	123,700
1971	-	-	25,100	25.0	3,000	3.0	64,800	64.5	7,600	7.6	-	-	100,500
1972	1,290,500	87.2	40,400	2.7	33,600	2.3	103,700	7.0	11,400	0.8	-	-	1,479,600
Mean (1963-72)	129,050	70.5	8,950	4.7	4,590	2.5	37,550	20.5	3,350	1.8	-	-	183,110
Mean (omitting 0's)	1,290,500	422.9	28,633	9.4	15,293	5.0	62,583	20.5	11,167	3.7	-	-	305,183
1973	174,800	40.0	95,700	21.9	100	.0	141,400	32.4	24,600	5.6	-	-	436,600
1974	-	-	2,400	1.1	-	-	162,900	71.9	61,300	27.1	-	-	226,600
1975	-	-	1,560	1.5	-	-	63,400	61.6	38,000	36.9	-	-	102,960
1976	-	-	2,700	2.8	68,200	69.5	18,600	19.0	8,600	8.8	-	-	98,100
1977	-	-	500	11.1	1,900	40.0	2,200	48.9	-	-	-	-	4,500
1978	-	-	69,900	34.8	124,800	62.1	5,300	2.6	1,000	0.5	-	-	201,000
1979	-	-	2,100	63.6	1,200	36.4	-	-	-	-	-	-	3,300
1980	273,900	35.8	87,400	11.4	35,600	4.7	207,000	27.1	160,600	21.0	-	-	764,500
1981	-	-	18,100	13.7	22,400	16.9	41,300	31.2	50,500	38.2	-	-	132,300
1982	-	-	1,400	0.3	38,000	7.3	259,200	49.6	224,000	42.9	-	-	522,600
Mean (1973-82)	44,870	10.0	28,176	11.3	29,210	11.7	90,150	36.2	56,860	22.8	-	-	249,246
Mean (omitting 0's)	224,350	90.0	28,176	11.3	36,513	14.6	100,144	40.2	71,075	28.5	-	-	249,246
Overall mean (1951-82)	78,380	27.1	57,010	19.7	23,690	8.2	78,430	26.4	40,080	13.9	13,720	4.9	288,270

[a] Catches made after 1960 excluded since they probably represent stocks bound for other areas.

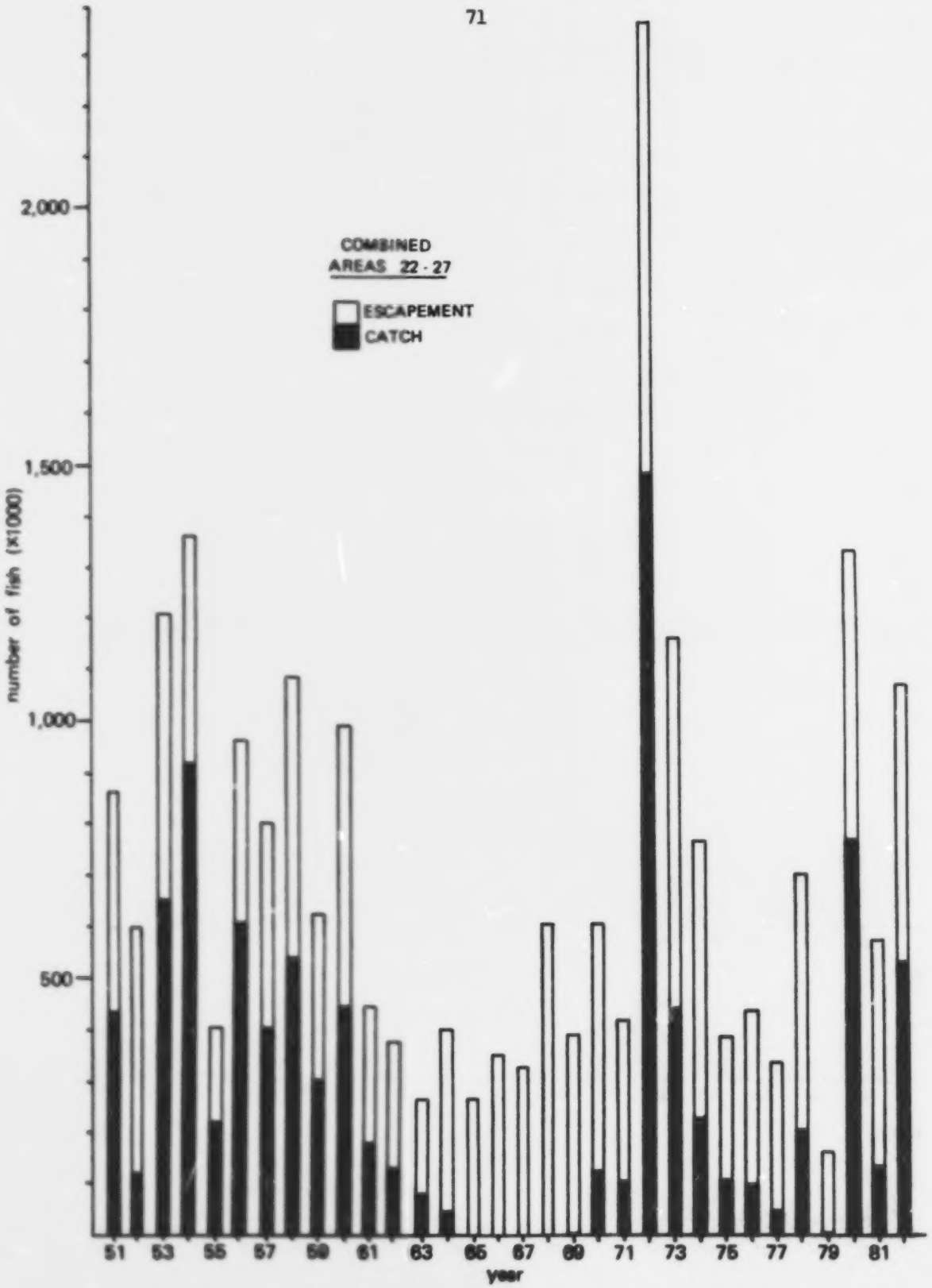


Fig. 27. Annual catch and escapement estimates for chum salmon in combined Areas 22 - 27, 1951 - 1982.

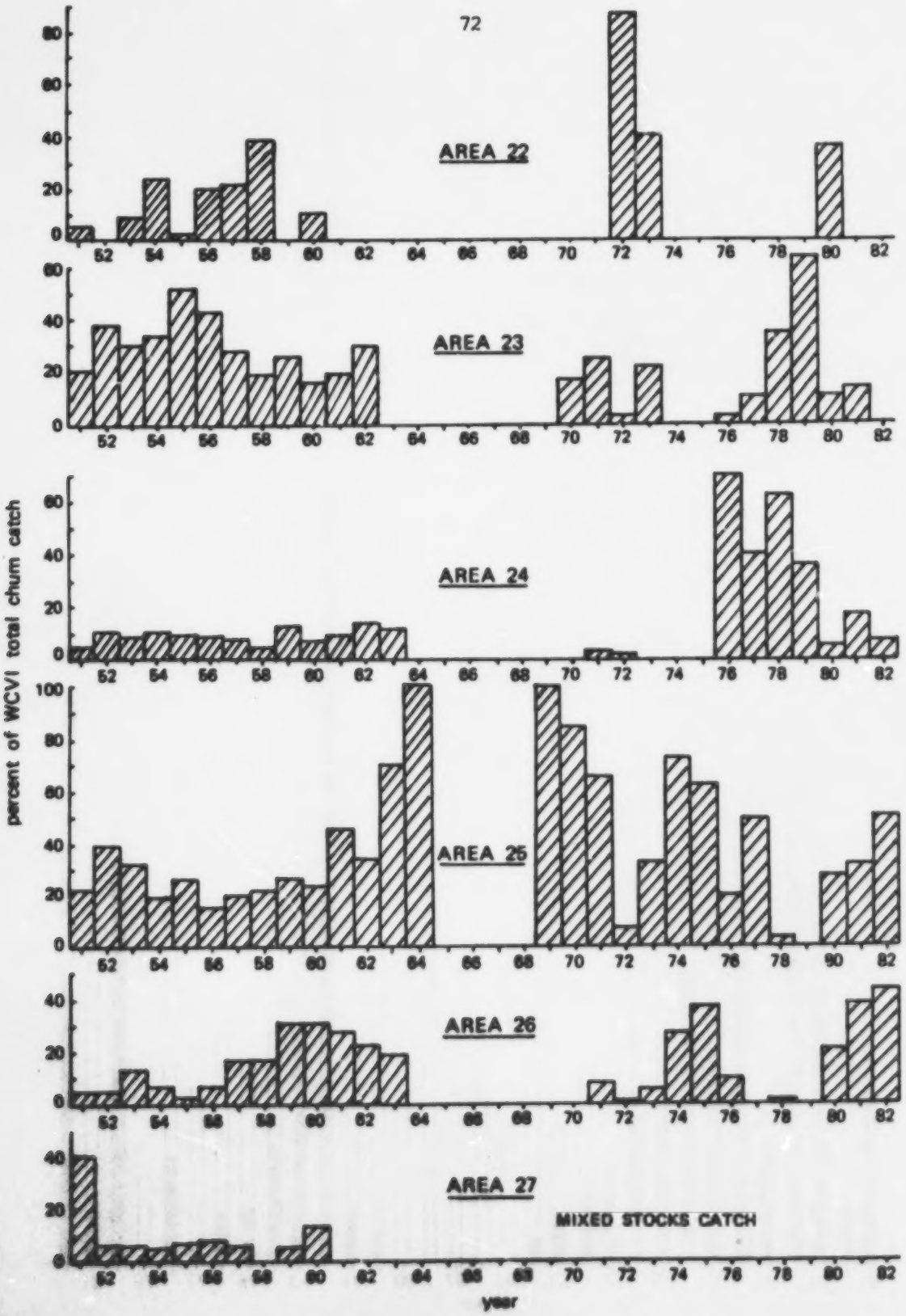


Fig. 28. Annual net catches of chum salmon in Areas 22 - 27, expressed as percent of WCVI total chum net catch, 1951 - 1982.

with the catches probably representing stocks bound for other areas. Overall mean annual catch contribution during the 1973 to 1982 period was highest in Area 25 (36%), followed by Area 26 (23%), Area 22 (18%), Area 24 (12%) and Area 23 (11%) (Table 47).

TOTAL STOCK ESTIMATES (CATCH AND ESCAPEMENT)

Annual chum stock estimates for individual and combined Areas 22 to 27 are presented for the period 1951 to 1982 in Table 48. Total WCVI stock levels have declined from around 0.8 million in the 1950's to around 0.6 million in the 1960's, then showed some recovery to around 0.7 million in the 1970's (Fig. 27). This pattern is probably due to overfishing in the 1950's and reduced fishing in the 1960's.

Between area comparisons show trends similar to those observed for catches (Fig. 29, Table 48). Area 22 had the greatest variability in annual stock size which ranged from 1% to 66% of the WCVI total, but which averaged around 13% in the 1950's and 1970's. Area 23 stock contributions have declined from around 30% of the WCVI production in the 1950's to around 22% in the next two decades. Area 24 stock contributions fluctuated between 7% and 14% in the last three decades while Area 25 share has remained relatively steady at around 25%. Area 26 has contributed each decade from 10% to 16% to the total WCVI chum stock while Area 27 showed the lowest contribution of only 5% to 9% of the WCVI total in each decade. Overall mean annual stock contribution during the 1973 to 1982 period was highest in Area 25 (28%), followed by Area 23 (22%), Area 26 (16%), Areas 22 and 24 (14% each) and Area 27 (6%) (Table 48).

RATES OF RETURN

Rates of return for Areas 22 to 27 (1966-1977 chum broods) are shown in Figure 30 and Table 49. Total WCVI estimates were obtained from weighted averages of available data for Areas 22 to 27 (Table 50). Fluctuations in the rates of return were more extreme for the combined WCVI chum stocks (range 0.36-5.37) than for Johnstone Strait (range 0.93-4.26) and Puget Sound normal-time spawners (range 1.29-5.41). There was no obvious correlation between rates of return for WCVI chum and corresponding values for the other two major stocks examined (Fig. 30).

The wide fluctuations observed in the rates of return for total WCVI chum stocks likely reflect the effects of floods resulting from heavy rainfall that frequently occurs in that area during November and December. These effects are magnified by rapid run-off from the large clearcut logging areas found in many of the watersheds. The wide fluctuations observed in the rates of return for a given area (e.g. range 0.08-17.02 for Area 26) are due to several factors which are difficult to isolate. They may include variation in environmental conditions during the freshwater and marine life cycle stages, and errors in estimating spawner abundance.

Incubation and early estuarine and marine rearing

Flooding is probably a major factor affecting egg survival of the WCVI chum stocks (Wickett 1958). Overspawning and the resultant superimposition of redds could also destroy a large number of eggs (Hunter 1959; Ginetz 1977), while extremes in fry density during downstream migration and early marine rearing may

Table 48. Annual chum salmon stock estimates (catch and escapement) for Areas 22 - 27, expressed as percent of WCVI total chum stock, 1951 - 1982.

YEAR	Area 22	% of Total	Area 23	% of Total	Area 24	% of Total	Area 25	% of Total	Area 26	% of Total	Area 27[a]	% of Total	Total stock
1951	39,600	4.6	233,300	27.0	91,600	10.6	149,300	17.3	80,700	9.3	270,500	31.3	865,000
1952	46,000	8.2	113,100	20.1	102,800	18.3	135,400	24.1	111,100	19.8	53,200	9.5	561,600
1953	76,400	6.3	426,300	35.1	121,800	10.0	344,800	28.4	164,700	13.5	81,500	6.7	1,215,500
1954	303,200	18.3	642,600	38.7	223,900	13.5	259,000	15.6	126,300	7.6	105,300	6.3	1,660,300
1955	19,700	4.9	167,700	41.7	58,900	14.6	89,900	22.3	31,600	7.9	34,700	8.6	402,500
1956	164,900	17.1	351,200	36.4	101,900	10.6	158,400	16.4	78,300	8.1	109,800	11.4	964,000
1957	108,600	13.5	253,900	31.5	84,200	10.4	122,100	15.1	140,900	17.5	96,700	12.0	806,400
1958	224,800	20.7	304,600	28.0	93,500	8.6	218,600	20.1	197,100	18.1	49,400	4.5	1,088,000
1959	23,000	3.7	171,000	27.3	97,600	15.6	151,100	24.1	147,200	23.5	36,300	5.8	626,200
1960	92,300	9.3	125,400	12.6	113,200	11.4	397,000	40.0	193,500	19.5	70,000	7.1	991,400
1961	44,200	9.9	83,100	18.6	41,000	9.2	186,900	41.9	68,700	15.4	21,700	4.9	445,600
1962	18,700	4.9	95,700	25.3	65,900	17.4	123,100	32.5	64,400	17.0	11,100	2.9	378,900
Mean (1951-62)	96,742	11.6	247,325	29.7	99,692	12.0	194,633	23.3	117,042	14.0	78,350	9.4	835,783
1963	6,700	2.5	36,100	13.7	24,500	9.3	159,100	60.3	25,200	9.6	12,100	4.6	263,700
1964	44,200	11.1	75,500	19.0	32,600	8.2	169,200	42.7	36,300	9.2	38,800	9.8	396,600
1965	80,300	30.4	70,200	26.5	9,000	3.4	58,700	22.2	31,300	11.8	15,000	5.7	264,500
1966	8,500	2.4	115,400	33.0	12,300	3.5	109,800	31.4	73,500	21.0	30,300	8.7	349,800
1967	21,200	6.6	134,300	41.6	32,600	10.1	88,200	27.3	35,200	10.9	11,500	3.6	323,000
1968	124,700	20.6	223,000	36.8	94,200	15.6	87,400	14.4	36,000	6.3	38,000	6.3	605,300
1969	18,800	4.8	170,400	43.9	39,500	10.2	92,300	23.8	46,100	11.9	20,800	5.4	387,900
1970	8,700	1.4	165,800	27.5	45,400	7.5	235,500	39.0	108,300	17.9	40,000	6.6	603,700
1971	55,200	13.2	115,000	27.4	21,500	5.1	134,000	32.0	75,300	18.0	18,000	4.3	419,000
1972	1,555,100	65.8	245,200	10.4	124,200	5.3	245,600	10.4	117,800	5.0	76,700	3.2	2,364,600
Mean (1963-72)	192,340	32.2	135,090	22.6	43,560	7.3	137,980	23.1	58,700	9.8	30,120	5.0	597,810
1973	345,800	29.8	243,000	20.9	58,400	5.0	326,600	28.2	124,500	10.7	61,800	5.3	1,160,100
1974	98,100	12.8	147,000	19.1	78,300	10.2	263,000	34.2	114,900	15.0	67,000	8.7	768,300
1975	9,900	2.6	116,960	30.6	37,700	9.9	129,500	33.8	71,500	18.7	17,100	4.5	382,660
1976	19,700	4.5	198,400	45.4	121,300	27.7	55,000	12.6	22,600	5.2	20,200	4.6	437,200
1977	43,700	13.0	128,500	38.3	70,000	20.9	57,300	17.1	16,600	4.9	19,400	5.8	335,500
1978	8,400	1.2	220,000	31.4	235,100	33.6	121,300	17.3	85,500	12.2	30,300	4.3	700,600
1979	4,500	2.8	50,900	32.2	30,800	19.5	40,800	25.8	14,700	9.3	16,200	10.3	157,900
1980	328,400	24.7	203,100	15.2	153,600	11.5	332,800	25.0	234,600	17.6	79,700	6.0	1,332,200
1981	115,000	19.9	85,600	14.8	86,300	15.0	158,500	27.5	100,500	17.4	30,900	5.4	576,800
1982	22,500	2.1	120,400	11.2	111,000	10.4	424,600	39.6	315,200	29.4	78,100	7.3	1,071,800
Mean (1973-1982)	99,600	14.4	151,396	21.9	98,250	14.2	190,940	27.6	110,060	15.9	42,070	6.1	692,306
Overall mean (1951 - 82)	127,800	17.8	182,300	25.5	81,700	11.4	175,800	24.6	96,800	13.5	51,900	7.3	715,800

[a] Catches made after 1960 excluded since they probably represent stocks bound for other areas.

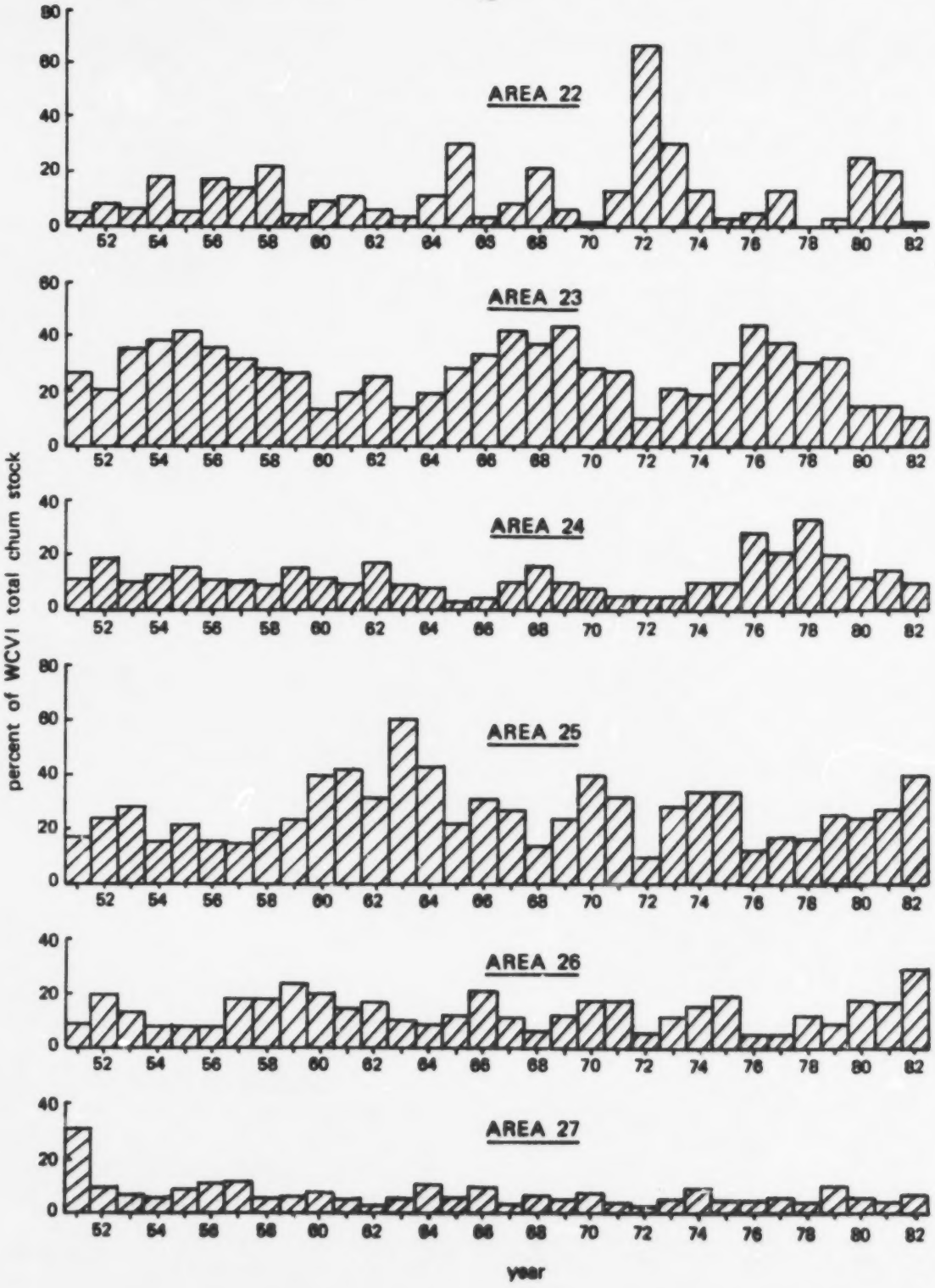


Fig. 29. Annual stock estimates (catch and escapement) of chum salmon in Areas 22 - 27, expressed as percent of WCVI total chum stock, 1951 - 1982.

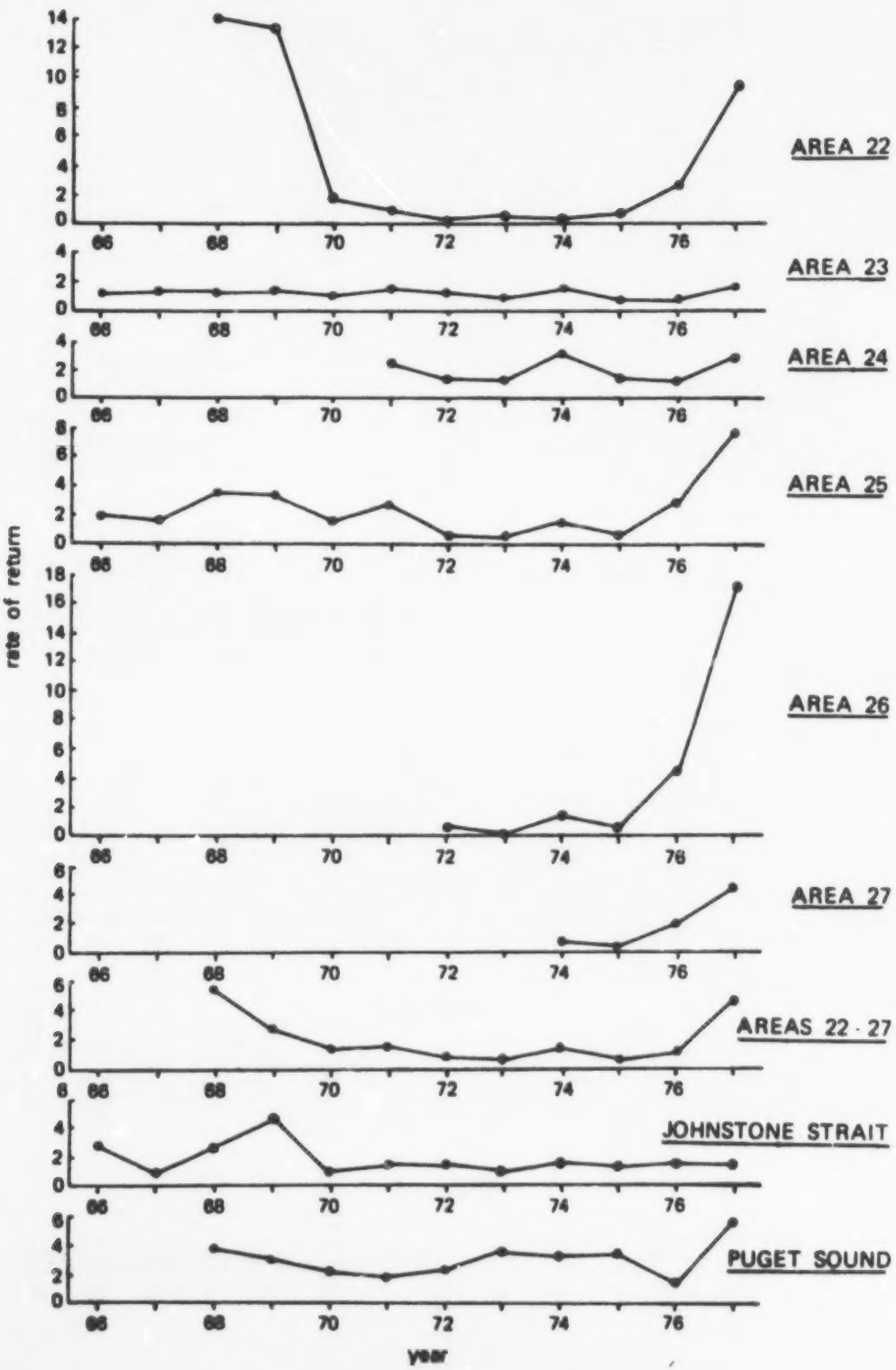


Fig. 30. Rates of return of chum salmon in individual and combined Areas 22 -27, Johnstone Strait and Puget Sound, 1966 - 1977.

Table 49. Chum rates of return for individual Areas 22-27, total WCVI, Johnstone Strait and Puget Sound, 1966-1977.

Brood year	Area 22	Area 23	Area 24	Area 25	Area 26	Area 27	Total WCVI[a]	Johnstone Strait[b]	Puget Sound[c]
1966	-	1.10	-	2.04	-	-	-[d]	2.81	-
1967	-	1.12	-	1.79	-	-	-[d]	0.93	-
1968	13.99	1.20	-	3.70	-	-	5.37	2.47	3.65
1969	13.43	1.39	-	3.16	-	-	2.77	4.26	2.98
1970	1.84	0.87	-	1.59	-	-	1.23	0.95	2.00
1971	0.75	1.47	2.13	2.53	-	-	1.66	1.28	1.88
1972	0.09	1.03	1.34	0.40	0.29	-	0.55	1.45	2.14
1973	0.26	0.61	0.99	0.22	0.08	-	0.36	1.00	3.66
1974	0.09	1.71	2.98	1.42	1.64	0.59	1.40	1.86	3.22
1975	0.49	0.41	1.30	0.41	0.48	0.31	0.54	1.23	3.39
1976	2.28	0.46	1.16	2.55	4.21	2.06	1.15	1.64	1.29
1977	9.39	1.73	2.68	7.78	17.02	4.26	4.86	1.40	5.41

[a] See Table 50 for calculations.

[b] From Gould (unpublished MS).

[c] J. Ames (Wash. State Dept. Fish., pers. comm.).

[d] Omitted since data from only two Statistical Areas were available.

Table 50. Total returns (catch and escapement) at ages 3, 4 and 5 and rates of return for WCVI chum stocks, 1967-1977 broods.[a]

Brood year	Areas included[b]	Escapement	Return at 3 years No.	Return at 3 years %	Return at 4 years No.	Return at 4 years %	Return at 5 years No.	Return at 5 years %	Total return from brood	Total Return / Escapement
1967	23,25	222,500	140,100	45.4	155,500	50.4	13,000	4.2	308,600	1.39
1968	22,23,25	435,100	134,200	5.7	1,959,900	83.9	240,600	10.3	2,334,700	5.37
1969	22,23,25	278,300	73,000	9.5	588,400	76.3	110,100	14.3	771,500	2.77
1970	22,23,25	286,300	86,000	24.4	256,000	72.6	10,500	3.0	352,500	1.23
1971	22-25	232,800	157,300	40.6	217,100	56.0	13,100	3.4	387,500	1.66
1972	22-26	808,100	78,100	17.6	353,900	79.9	11,200	2.5	443,200	0.55
1973	22-26	661,700	48,300	20.1	181,200	75.2	11,300	4.7	240,800	0.36
1974	22-27	541,700	134,800	17.8	606,300	79.9	17,600	2.3	758,700	1.40
1975	22-27	279,700	82,600	55.2	61,200	40.9	5,900	3.9	149,700	0.54
1976	22-27	339,100	79,100	20.3	303,100	78.0	6,500	1.7	388,700	1.15
1977	22-27	331,000	1,022,800	63.6	537,500	33.4	47,500	3.0	1,607,800	4.86
Total	-	4,416,300	2,036,300	26.3	5,220,100	67.4	487,300	6.3	7,743,700	3.80

[a] For individual Areas see Appendix 9.

[b] Areas lacking age composition data were excluded.

lead to increased mortality from predation at lower densities (Hunter 1959; Parker 1968) and competition at high densities.

The total returns of WCVI chum salmon were plotted against the corresponding escapements for 1968 to 1977 brood years (Fig. 31, Table 50); areas lacking age composition data were excluded. Higher total returns were apparent for escapements increasing from 300,000 to 600,000, with a subsequent decrease at larger escapements. This trend is supported by the data presented by Pearse (1982) where an optimum mean escapement for WCVI chum stocks of 522,000 (range 400,000-700,000) was suggested. Lack of fry abundance data precluded finding any density-dependant relationship that may exist at the freshwater and early marine life stages. Peterman (1978) observed that the survival of Babine Lake sockeye smolts was density-dependant and that most of the mortality resulting from high densities occurred in early marine life.

High seas survival

The WCVI chum salmon returning to their native streams may pass through several coastal fisheries along the Vancouver Island. However, since most domestic net fishing occurs in inshore and freshwater zones, it is likely that the WCVI chum stocks bound for different areas are not intercepted by coastal fisheries to any extent except by troll gear.

Other variables which may affect chum marine survival include ocean currents, water temperatures, competition and predation. These factors are probably most important in the early marine stages when estuarine and coastal environments are utilized.

EXPLOITATION BY NET FISHERIES

Percent exploitation of chum salmon by the net fisheries in Areas 22 to 27 is shown for the period 1951 to 1982 in Figure 32 and Table 51. Exploitation of the total WCVI stocks was highest (49%) in the 1950's, lowest (31%) in the 1960's when the fishery was closed for an extended period, and intermediate (36%) in the 1970's and early 1980's. Between 1973 and 1982, the highest 10-year mean exploitation rate was observed for Area 26 (52%), followed by Area 25 (47%), Area 22 (45%), Area 24 (30%) and Area 23 (19%); Area 27 was not considered due to its mixed stock catch. During 1973 to 1982, Area 25 was the most consistent chum producer with nine years of harvest while Area 22 was the least consistent producer with only two years of harvest.

AGE COMPOSITION

The age composition of returning chum adults is of considerable concern to fishery managers since the age ratios are used to forecast returns. Chum age compositions by brood year for each WCVI area showed that 4-year olds dominate the returns, but occasionally, especially in Area 22, 3-year olds may return in greatest abundance (Fig. 33, Appendix 9). No close correlation was apparent in age composition among the different areas.

The overall WCVI chum returns at ages 3, 4 and 5 for broods 1967 to 1977 are shown in Table 50. These values are based on the available age composition data for Areas 22 to 27. One noticeable trend in the data is the late maturation of the 1968 and 1969 broods (10.3% and 14.3% 5-year olds respectively). Similar ratios were evident for chum stocks from the same broods

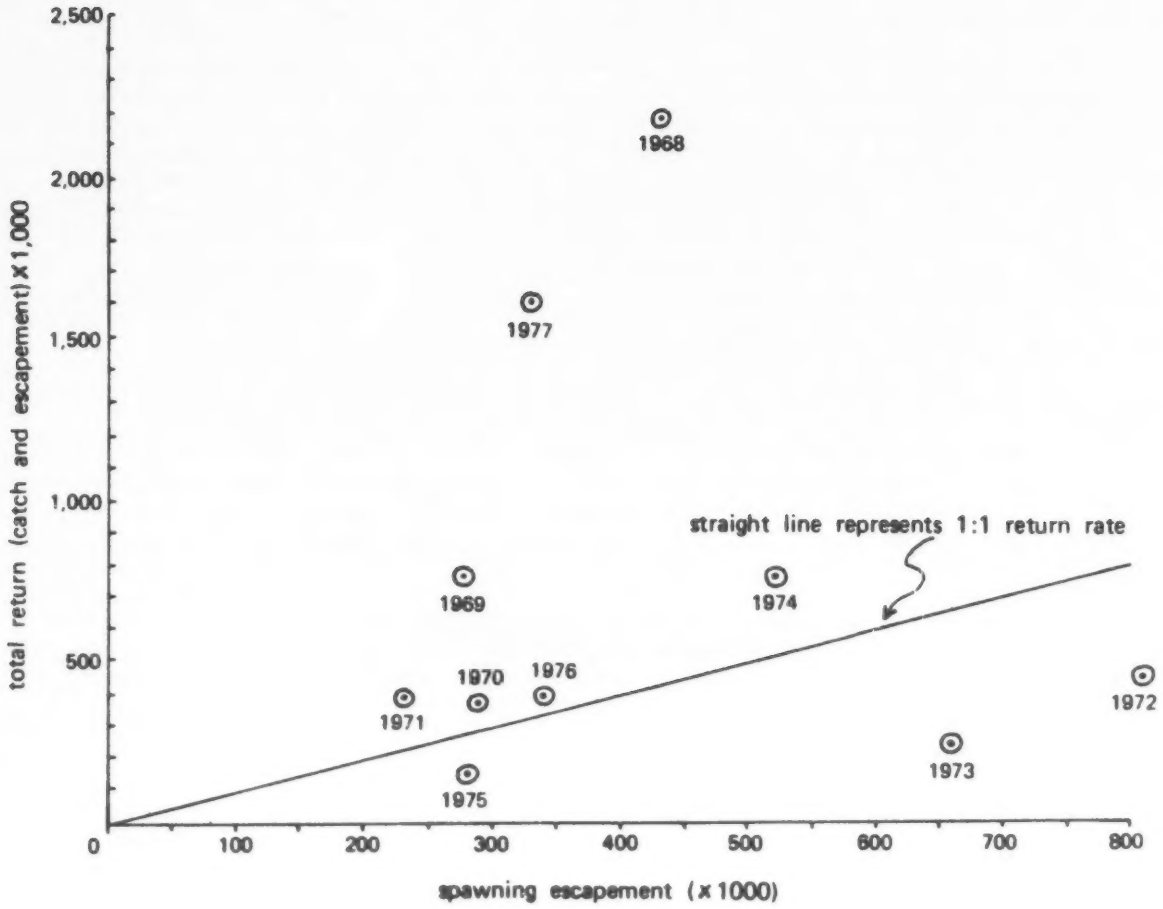


Fig. 31. Relationship between total returns and spawning escapements for WCVI chum salmon, 1968 - 1977 brood years.

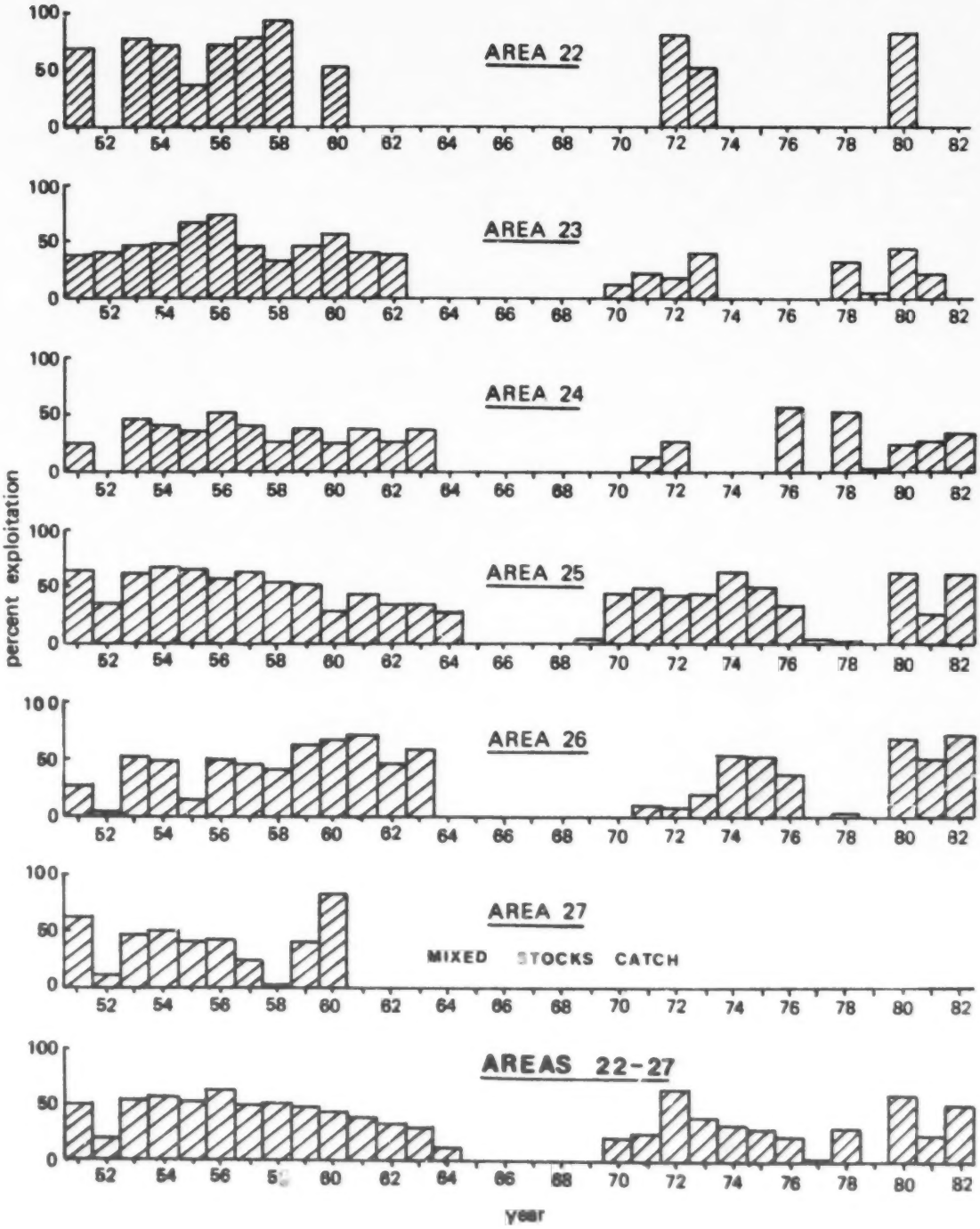


Fig. 32. Percent exploitation of chum salmon in the net fisheries in Areas 22 - 27, 1951 - 1982.

Table 51. Annual percent exploitation (catch/total return) of chum salmon in the net fisheries in Statistical Areas 22-27, 1951-1982.[a]

Year	STATISTICAL AREA						
	22	23	24	25	26	27[b]	22 - 27
1951	68	39	25	64	30	65	50
1952	0	40	13	35	6	14	21
1953	78	47	46	61	53	48	54
1954	72	49	43	67	50	51	55
1955	37	68	36	65	17	42	55
1956	72	73	53	56	50	44	63
1957	79	45	40	64	47	25	50
1958	92	34	26	53	44	4	50
1959	0	45	38	51	64	42	48
1960	52	57	25	26	68	83	44
1961	0	40	37	42	70	0	39
1962	0	39	26	34	44	0	33
Mean[c] (1951-1962)	66	49	35	50	48	47	49
1963	0	0	36	35	58	-	30
1964	0	0	0	27	0	-	12
1965	0	0	0	0	0	-	0
1966	0	0	0	0	0	-	0
1967	0	0	0	0	0	-	0
1968	0	0	0	0	0	-	0
1969	0	0	0	4	0	-	1
1970	0	12	0	44	0	-	21
1971	0	22	14	48	10	-	24
1972	83	17	27	42	10	-	63
Mean[c] (1963-1972)	67	6	11	27	6	-	31
1973	51	39	0	43	20	-	38
1974	0	2	0	62	53	-	30
1975	0	1	0	49	53	-	27
1976	0	1	56	34	38	-	22
1977	0	0	3	4	0	-	1
1978	0	32	53	4	1	-	29
1979	0	4	4	0	0	-	2
1980	83	43	23	62	69	-	57
1981	0	21	26	26	50	-	23
1982	0	1	34	61	71	-	49
Mean[c] (1973-1982)	45	19	30	47	52	-	36

[a] Annual catches and escapements are shown in individual Area sections in the text.
[b] Catches probably represent stocks bound for other areas.
[c] Using mean catches and total returns by Area from Tables 47 and 48.

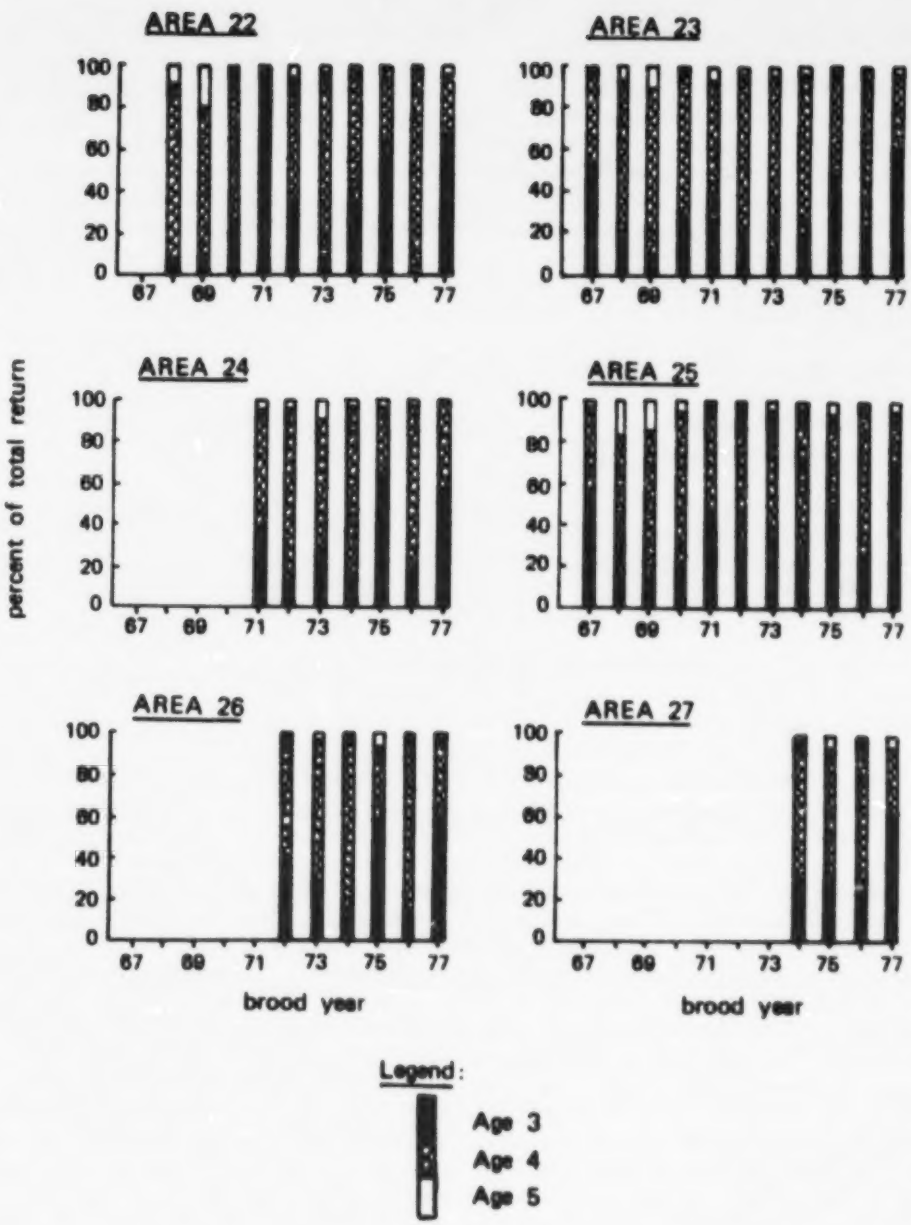


Fig. 33. Percent of total return at ages 3, 4 and 5 for WCVI chum salmon in Areas 22 - 27, 1967 - 1977 broods.

in Johnstone Strait (Gould, MS in prep'n) and Puget Sound (J. Ames, Wash. State Dept. Fish., pers. comm.). The above WCVI stocks also had higher than average total rates of return (Table 49). Peterman (1982) proposed that ocean abundance of a stock affects the age at which the fish return. The more juveniles in the brood, the greater the proportion of the late maturing fish. Since the WCVI escapements yielding the 1968 and 1969 broods were only moderate in size, a high freshwater survival must be assumed if the above theory is valid. Data on chum juvenile production in major WCVI rivers would be necessary to further validate this theory with respect to WCVI chum stocks. The percentage of WCVI chum returning at age 3 was plotted against the corresponding brood escapements (Fig. 34, Table 50); areas lacking age composition data were excluded. A regression analysis performed on these data using natural logarithms showed a significant ($p<0.01$) negative relationship between the two components, supporting the theory that small broods lead to early maturation.

The percent of total return at age 3 for Johnstone Strait and Puget Sound chum stocks were compared by brood year to WCVI data (Fig. 35, Table 52). The WCVI values correlated well with both the Johnstone Strait and Puget Sound data ($p < 0.01$) suggesting a coast-wide trend in chum age variation.

Appendix 3 shows the WCVI age samples by week for the period of 1977 to 1982. A slightly older age composition is apparent in the early part of most runs; however, early age samples generally give a good indication of the overall age composition for the season. This, along with early catch per unit of effort data, could be useful in updating the pre-season estimates of run sizes.

DISCUSSION OF MANAGEMENT PROBLEMS

FORECASTING RETURNS

The main problem in managing the WCVI chum stocks is the difficulty in predicting returns. Extreme variations in survival rates and age compositions result in very wide confidence limits for estimates of total stock. Gillnet test fisheries can offer a partial solution to the problem by providing in-season stock estimates. Results indicate varying success from area to area but refinements in test fishery patterns, especially early in the season, could provide good predictions of stock strength. In the future, Area 25 and 26, both important chum producers, should have their own test fishing boat.

Accuracy of annual escapement estimates is another essential feature for accurate stock forecasting and management. While catches are easy to measure accurately, escapements are not. Recent literature contains many references on the subject. Cousens et al. (1982) summarized the relevant references on escapement estimation and concluded that visual estimates, such as those made on most WCVI streams, led to underestimates and varied considerably with individual observers. Shardlow et al. (MS 1985) also concluded that visual estimates underestimate escapements, and quantified these effects in various east coast of Vancouver Island streams. Hilborn (1983) recommended a standardization of counting and recording methods and better training of field staff in order to improve the DFO escapement estimates.

The amounts by which escapement estimates for a given spawning population may vary when using visual compared to mark recapture survey method are shown in Table 53. These examples suggest that present methods of enumerating WCVI chum escapements are producing significant underestimates. In future, more effort

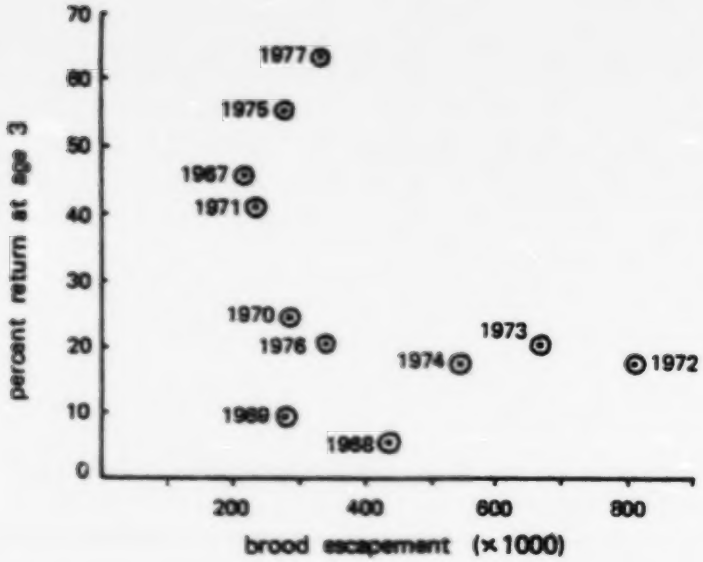


Fig. 34. Percent return at age 3 related to corresponding brood escapements for WCVI chum cstocks, 1967 - 1977 brood years.

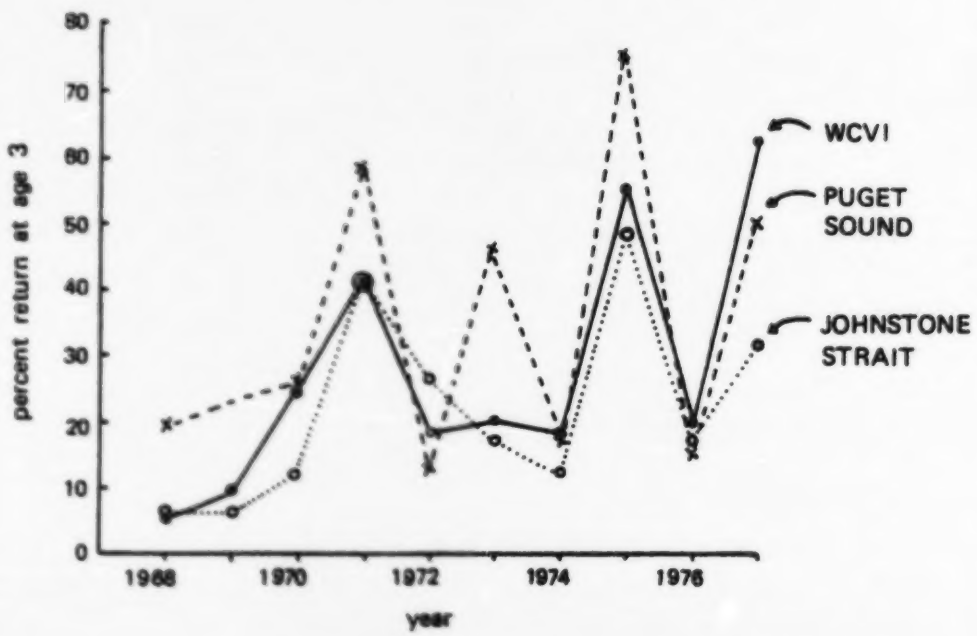


Fig. 35. Percent return at age 3 for WCVI, Johnstone Strait and Puget Sound chum stocks, 1968 - 1977 brood years.

Table 52. Percent total return at age 3 for WCVI, Johnstone Strait and Puget Sound chum stocks, 1968-1977 broods.

Brood year	WCVI	Johnstone Strait	Puget Sound
1968	5.7	6.8	19.4
1969	9.5	6.3	23.0
1970	24.4	11.6	26.1
1971	40.6	40.7	58.4
1972	17.6	26.3	12.8
1973	20.1	17.4	45.6
1974	17.8	12.5	17.2
1975	55.2	48.4	74.6
1976	20.3	17.4	15.6
1977	63.6	31.5	49.6

Table 53. Chum escapement estimates for six WCVI streams using two different methods of evaluation.

Stream	Year	Visual estimates	Mark recapture estimates[a]	Reference
Nitinat River	1979	4,000	14,300 (not given)	McCart et al. (MS 1980)
Sucwoa River	1978	-[b]	17,900 (14,000-22,800)	Glova and McCart (1979)
Canton Creek	1978	800	5,500 (4,300-7,100)	Glova and McCart (1979)
Conuma River	1978	7,500	23,600 (20,300-26,600)	Glova and McCart (1979)
Tlupana River	1978	3,500	9,700 (6,100-15,400)	Glova and McCart (1979)
Deserted River	1978	9,000	74,200 (66,100-83,200)	Glova and McCart (1979)

[a] 95% confidence limits are given in parenthesis.
[b] Not inspected.

Table 54. Comparison of commercial value of bright and dark chum salmon, 1979-1982.

Year	Prices paid to fishermen ($/kg.)		
	Bright (Port Hardy)[a]	Dark (Port Hardy)[a]	WCVI[b]
1979	2.86 - 3.74	2.20	-
1980	2.31 - 2.53	1.76 - 3.52	1.43 - 1.65
1981	1.98 - 2.20	1.43 - 1.58	1.76 - 1.87
1982	2.64 - 2.86	0.66 - 1.21[c]	1.76 - 1.87

[a] Seafood Products Ltd. (Port Hardy).
[b] Trans-Pacific Fish Co. (Ucluelet).
[c] Ungraded fish caught on WCVI (Areas 22-27) and processed in Port Hardy.

should be directed toward training observers and visiting streams during periods of chum salmon spawning.

OPTIMIZING COMMERCIAL VALUE

Generally, the earlier the fisheries are held and the further from spawning grounds they occur, the greater the value of the catches. The late entry of WCVI chum stocks into the fishing areas and the proximity of these zones to the chum spawning grounds result in harvesting of relatively dark fish. By comparison, the Juan de Fuca and Johnstone Strait fisheries which target on fish distant from terminal areas, harvest bright fish. Prices paid to fishermen for the WCVI chum are therefore relatively low compared, for example, to the "bright" gillnet-caught chum in the Port Hardy area (Table 54).

The recent increase in demand for bright chum is the result of good markets for fresh, frozen and "mild cure" products. Demand for canned chum is poor. Therefore, opportunities for harvesting the WCVI chum in a brighter condition should be considered at this time. Traditionally, the WCVI chum stocks have been harvested inside the surfline. An outside fishery would depend on the availability of early stock estimates and the ability to isolate stocks prior to their entry into the various terminal fishing areas so as not to create mixed stock fisheries. The strategy of fishing outside the surfline is particularly applicable to Area 22 where fish quality deteriorates rapidly upon entry into Nitinat Lake. A fishery outside the lake may, however, intercept the Fraser River and Puget Sound stocks present concurrently outside the surfline. Nevertheless, since known proportions of the Nitinat hatchery chum are marked, test fishing for marked-to-unmarked ratios in the outside fishery could identify the hatchery stock and lead to successful management of outside fisheries in Area 22. Electrophoretic stock identification may also prove useful here.

Likewise, the increased chum returns to Area 25 due to hatchery production complicate the management of chum stocks in that area. Originally, it was intended to harvest the hatchery production in Tlupana Inlet (Fig. 14). With this in mind, stocks from all five streams (Canton, Conuma, Deserted, Sucwoa and Tlupana) were to be enhanced in proportion to the strength of their runs in order to allow for maximum utilization of the returns. In reality, the difficulty in obtaining brood stock made the terminal harvesting in Tlupana Inlet impossible, although all five streams have been enhanced to some degree.

The problem which arises in the management of Area 25 fishery is similar to the one described above for Nitinat Lake, but with added complications. On entering the Nootka Sound side of Area 25 (Fig. 14), chum salmon bound for Tlupana Inlet and for all other streams on this side of the Sound mill around the main body of the Sound for varying lengths of time depending on conditions. The area in which this occurs stretches from Hoiss Pt. out to the mouth of the Sound (Fig. 14). On entering the Sound the fish are in bright or semi-bright condition but they quickly deteriorate and after a short time become dark. By the time the fish from Tlupana Inlet have separated from the others, they have lost much of their commercial value. In order to maximize the value of these fish, it would be necessary to harvest them as they enter the Sound. However, since fish from all streams in the area are mixed as they enter, overharvesting of the unenhanced stocks is a real danger.

No easy solution to the above fishery management problem is apparent. However, the problem could be reduced if the timing of the enhanced fish was

different from the wild fish. An early run of chum into the Conuma River enters Nootka Sound in early September. These fish are usually in the river by the end of September which is well before the main run timing. This early run of up to 3,000 fish reportedly maintain the bright condition longer than the main run. If the emphasis of the Tlupana hatchery were switched to enhancing this early run, the management problem outlined earlier would be reduced. This approach would take several cycles to develop and merits investigation.

ACKNOWLEDGEMENTS

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Appendix 1a. WCVI troll catches of chum salmon, 1970-1982.[a,b]

Year	Area 23	Area 24	Area 25	Area 26	Area 27	Total
1970	904	1,452	1,013	1,564	4,182	9,115
1971	704	417	821	354	3,317	5,613
1972	387	67	262	131	423	1,270
1973	2,792	772	619	636	1,154	5,973
1974	539	525	2,579	223	674	4,540
1975	1,466	488	957	1,219	3,512	7,642
1976	545	403	650	513	849	2,960
1977	2,630	1,853	523	821	3,972	9,799
1978	1,766	3,016	4,479	4,153	17,781	31,195
1979	3,332	4,186	2,936	1,445	6,877	18,776
1980	1,613	5,307	811	1,243	11,934	20,908
1981	1,495	1,368	985	397	4,560	8,805
1982	7,043	11,949	9,872	3,018	39,519	71,401

[a] From B.C. Catch Statistics.
[b] No troll fishery occurs in Area 22.

Appendix 1b. WCVI Indian Food Fishery catches of chum salmon, 1958-1982.[a]

Year	Area 22	Area 23	Area 24	Area 25	Area 26	Area 27	Total
1958	-[b]	100	4,450	-	685	-	5,235
1959	-	100	4,750	-	400	-	5,250
1960	-	100	5,395	-	575	-	6,070
1961	-	100	4,375	-	0	-	4,475
1962	-	100	4,620	2,400	1,000	-	8,120
1963	-	100	0	3,000	20	-	4,020
1964	-	100	0	800	600	-	1,500
1965	-	100	0	400	700	750	1,950
1966	-	200	430	2,000	370	-	3,000
1967	-	1,420	2,610	865	-	-	4,890
1968	-	1,400	3,510	1,220	400	28	6,558
1969	-	1,400	1,470	1,460	476	-	4,806
1970	-	60	1,700	1,350	105	4	3,219
1971	-	1,796	2,252	1,000	550	-	5,598
1972	420	420	2,164	750	452	70	4,276
1973	638	10	1,955	500	-	-	3,103
1974	1,413	2,000	2,180	62	730	-	6,385
1975	144	1,000	1,553	450	250	-	3,397
1976	125	100	500	300	340	-	1,365
1977	654	3,065	2,150	0	800	-	6,669
1978	350	2,000	2,388	400	550	-	5,688
1979	29	1,100	3,138	1,130	1,420	-	6,817
1980	500	600	3,000	500	2,500	-	7,100
1981	500	1,000	4,200	500	200	-	6,400
1982	-	800	-	-	-	-	800

[a] From DFO files, WCVI District Offices.
[b] Fishery not monitored.

Appendix 2a. Annual chum salmon escapements to individual streams in Area 22, 1947-1982.[a]

Area 22	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Caycuse River	..[b]	-	-	-	1,500	3,500	1,500	3,500	1,500	3,500
Cheewhat River	-	-	-	-	-	-	-	-	-	75
Doobah Creek	-	-	-	-	-	-	-	-	-	-
Hobiton Creek	-	-	1,500	3,500	3,500	7,500	7,500	7,500	7,500	7,500
Nitinat River	-	7,500	1,500	75,000	7,500	35,000	7,500	75,000	3,500	35,000
Total	-	7,500	3,000	78,500	12,500	46,000	16,500	86,000	12,500	46,075

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Caycuse River	750	400	400	1,500	1,500	200	200	1,500	200	75
Cheewhat River	75	75	75	75	200	25	25	200	75	75
Doobah Creek	-	-	-	-	-	-	-	-	1,500	400
Hobiton Creek	7,500	3,500	7,500	7,500	7,500	3,500	1,500	7,500	3,500	400
Nitinat River	15,000	15,000	15,000	35,000	35,000	15,000	5,000	35,000	75,000	7,500
Total	23,325	18,975	22,975	44,075	44,200	18,725	6,725	44,200	80,275	8,450

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Caycuse River	1,500	3,500	750	750	1,500	15,000	3,500	1,500	750	350
Cheewhat River	400	200	25	25	N.O.[c]	75	25	N.O.	N.O.	75
Doobah Creek	750	3,500	3,500	400	200	12,000	1,500	800	400	850
Hobiton Creek	3,500	7,500	3,500	3,500	3,500	2,500	6,000	800	750	400
Nitinat River	15,000	110,000	11,000	4,000	50,200	230,000	160,000	95,000	8,000	18,000
Total	21,150	124,700	18,775	8,675	55,200	264,575	171,025	98,100	9,900	19,675

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Caycuse River	300	300	200	3,000	-	-				
Cheewhat River	50	-	N.O.	-	-	N.O.				
Doobah Creek	800	300	130	500	-	-				
Hobiton Creek	550	1,800	200	1,000	4,000	-				
Nitinat River	42,000	6,000	4,000	50,000	11,000	22,500				
Total	43,700	8,400	4,530	54,500	15,000	22,500				

[a] Data obtained from the annual stream reports submitted by the fishery officers.
[b] --- Stream not inspected.
[c] N.O. - None observed.

Appendix 2b. Annual chum salmon escapements to individual streams in Area 23, 1947-1982.[a]

Area 23	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Canoe Pass Creek	-[b]	75	200	1,500	750	1,500	200	200	200	75
Carnation Creek	-	255	3,500	1,500	750	750	1,500	1,500	400	200
Cataract Creek	-	147	400	400	750	200	750	200	400	200
China Creek	-	1,500	1,500	1,500	400	200	75	200	200	25
Coeur D'Alene Cr.	-	75	400	750	200	75	75	400	75	200
Coleman Creek	-	200	200	1,500	400	25	25	25	25	25
Consinka Creek	-	750	400	1,500	750	400	750	1,300	750	400
Cous Creek	-	1,500	1,500	1,500	1,500	400	200	750	N.O.[c]	200
Dutch H. Cr.East	-	7,500	-	-	7,500	3,500	3,500	7,500	1,500	3,500
Dutch H. Cr.West	-	-	-	-	-	-	-	750	750	750
Effingham River	-	75	1,500	7,500	1,500	750	1,500	7,500	3,500	3,500
Franklin River	-	200	200	1,500	200	400	200	200	75	200
Frederick Creek	-	400	750	1,500	200	200	200	400	400	25
Henderson River	-	3,500	3,500	3,500	1,500	1,500	35,000	7,500	1,500	3,500
Holford Creek	-	400	400	1,500	750	200	750	1,500	1,500	400
Klanawa River	-	75	400	-	-	-	750	3,500	-	1,500
Little Maggie R.	-	-	-	-	-	-	-	750	75	25
Little Toquart Cr.	-	7,500	3,500	15,000	-	-	-	15,000	400	1,500
Lucky Creek	-	200	200	750	1,500	75	1,500	400	75	400
Macktush Creek	-	200	200	750	75	75	750	200	25	25
Maggie River	-	75	75	400	750	200	1,500	400	200	200
Mercantile Creek	-	25	25	400	200	25	75	200	75	75
Mercer Creek	-	1,500	1,500	1,500	400	750	750	1,500	200	400
Nahmint River	-	35,000	35,000	75,000	35,000	15,000	100,000+	75,000	3,500	7,500
Pachena River	-	200	400	1,500	1,500	200	750	1,500	400	400
Pipestem River	-	250	400	1,500	7,500	750	1,500	1,500	400	3,500
Poett Nook Creek	-	212	1,500	1,500	400	400	200	400	200	750
Salmon Creek	3500	90	750	1,500	3,500	1,500	3,500	7,500	1,500	1,500
Sandy Creek	-	200	75	400	750	75	75	200	200	200
Sarita River	-	35,000	35,000	35,000	7,500	15,000	15,000	75,000	15,000	35,000
Sechart Creek	-	200	75	750	750	25	400	400	200	25
Snug Basin Cr.	-	3,500	1,500	1,500	3,500	750	1,500	3,500	750	400
Somass River	-	750	1,500	7,500	15,000	750	7,500	7,500	3,500	1,500
Sugsaw Creek	-	750	400	3,500	3,500	3,500	3,500	3,500	7,500	3,500
Toquart River	-	15,000	15,000	35,000	35,000	15,000	35,000	75,000	3,500	7,500
Two Rivers East	-	-	-	-	-	-	-	7,500	200	3,500
Two Rivers West	-	400	750	7,500	3,500	1,500	3,500	400	200	75
Uchuck Creek	-	3,500	3,500	15,000	3,500	1,500	3,500	7,500	3,500	3,500
Useless Creek	-	750	75	400	400	200	750	750	75	200
Vernon Creek	-	400	75	400	200	200	200	200	75	25
West Creek	-	400	400	750	1,500	400	750	7,500	1,500	7,500
Total	-	122,734	116,750	233,150	143,075	67,975	227,675	326,925	54,525	93,900

Appendix 2b (cont'd).

Area 23	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Canoe Pass Creek	75	200	200	200	75	25	75	200	25	400
Carnation Creek	1,500	1,500	400	200	750	400	200	1,500	750	750
Cataract Creek	750	1,500	750	400	200	200	75	200	200	400
China Creek	25	75	75	25	75	25	25	25	25	25
Coeur D'Alene Cr.	400	400	750	200	75	200	25	75	75	75
Coleman Creek	25	25	25	25	25	25	25	25	25	400
Consinka Creek	200	200	750	200	200	200	200	75	200	400
Cous Creek	200	750	200	75	200	200	75	25	200	400
Dutch H. Cr.East	3,500	7,500	3,500	750	750	400	750	400	25	750
Dutch H. Cr.West	1,500	1,500	1,500	400	200	75	75	75	75	750
Effingham River	7,500	7,500	3,500	3,500	1,500	750	750	3,500	1,500	7,500
Franklin River	75	200	25	25	25	75	25	400	200	1,500
Frederick Creek	200	200	200	25	200	75	25	25	200	200
Henderson River	7,500	7,500	3,500	3,500	3,500	1,500	750	3,500	3,500	3,500
Holford Creek	750	750	400	750	750	200	400	750	750	750
Klanawa River	N.O.	N.O.	-	200	750	400	N.O.	400	N.O.	400
Little Maggie R.	400	400	750	200	400	75	75	75	200	750
Little Toquart Cr.	15,000	15,000	3,500	3,500	3,500	3,500	750	750	750	7,500
Lucky Creek	750	750	200	75	400	75	200	200	200	200
Mactush Creek	25	25	25	25	25	25	25	25	25	200
Maggie River	750	1,500	750	750	750	400	200	200	400	400
Mercantile Creek	200	750	1,500	75	75	25	400	75	75	750
Mercer Creek	400	750	750	75	400	400	200	750	200	3,500
Nahmint River	15,000	35,000	15,000	7,500	7,500	15,000	15,000	10,000	35,000	15,000
Pachena River	1,500	750	400	75	400	200	200	200	200	750
Pipestem River	1,500	1,500	1,500	400	750	200	200	400	400	750
Poett Nook Creek	400	750	400	200	75	400	25	200	75	400
Salmon Creek	3,500	7,500	7,500	1,500	400	750	750	750	200	3,500
Sandy Creek	400	400	400	200	200	25	25	75	200	200
Sarita River	35,000	35,000	15,000	15,000	7,500	15,000	7,500	35,000	15,000	35,000
Sechart Creek	400	200	200	25	75	25	200	75	25	400
Snug Basin	1,500	1,500	200	200	75	75	25	75	25	400
Somass River	7,500	7,500	3,500	1,500	3,500	3,500	1,500	750	1,500	1,500
Sugsaw Creek	3,500	3,500	3,500	1,500	1,500	1,500	1,500	1,500	750	1,500
Toquart River	15,000	35,000	15,000	7,500	7,500	7,500	1,500	7,500	3,500	15,000
Two Rivers East	3,500	7,500	3,500	400	400	400	750	400	400	3,500
Two Rivers West	200	400	750	75	25	75	400	200	25	750
Uchuck Creek	7,500	7,500	3,500	1,500	1,500	3,500	750	1,500	1,500	3,500
Useless Creek	400	200	400	75	75	25	25	75	75	75
Vernon Creek	75	200	75	75	200	25	25	75	200	200
West Creek	1,500	7,500	400	1,500	3,500	750	400	3,500	1,500	1,500
Total	140,100	200,875	94,475	54,400	50,000	58,200	36,100	75,525	70,175	115,425

Appendix 2b (cont'd).

Area 23	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Canoe Pass Creek	200	200	200	75	75	200	200	150	150	200
Carnation Creek	1,500	1,500	3,500	3,500	1,500	3,500	4,168	2,870	1,200	1,500
Cataract Creek	400	400	400	400	75	750	75	150	300	450
China Creek	200	200	25	N.O.	N.O.	25	75	75	N.O.	20
Coeur D'Alene Cr.	750	750	750	200	75	750	400	750	150	250
Coleman Creek	75	400	75	200	25	1,500	N.O.	N.O.	10	40
Consinka Creek	200	750	400	750	400	750	500	750	400	500
Cous Creek	200	400	3,500	750	200	1,500	750	350	400	550
Dutch H. Cr.East	200	400	3,500	1,500	75	1,500	200	750	200	1,050
Dutch H. Cr.West	200	750	750	750	75	750	400	400	200	800
Effingham River	7,500	15,000	3,500	9,000	200	15,000	7,500	8,000	4,000	8,500
Franklin River	750	750	75	75	25	200	75	150	75	250
Frederick Creek	3,500	3,500	3,500	400	750	750	1,500	1,000	750	2,500
Henderson River	3,500	7,500	3,500	3,500	750	3,500	750	3,500	750	4,200
Holford Creek	1,500	750	3,500	400	200	750	1,000	750	900	800
Klanawa River	400	400	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	150	45
Little Maggie R.	200	200	400	75	25	750	400	150	75	800
Little Toquart Cr	750	3,500	3,500	3,500	400	7,500	5,000	750	4,500	6,200
Lucky Creek	750	400	750	400	75	400	200	150	75	250
Mactush Creek	25	400	N.O.	25	N.O.	25	N.O.	25	N.O.	N.O.
Maggie River	1,500	750	200	750	75	1,500	200	750	200	2,000
Mercantile Creek	75	200	400	400	200	200	200	75	200	240
Mercer Creek	750	750	3,500	1,500	400	1,500	750	750	75	1,200
Nahmint River	35,000	75,000	35,000	35,000	12,000	35,000	35,000	15,000	20,000	40,000
Pachena River	1,500	750	75	75	N.O.	200	200	200	75	400
Pipestem River	400	750	750	200	200	750	750	1,000	400	280
Poett Nook Creek	200	750	400	750	750	750	400	1,000	650	600
Salmon Creek	1,500	3,500	1,500	7,500	1,500	15,000	3,500	3,500	400	5,700
Sandy Creek	200	400	75	400	200	400	200	400	400	450
Sarita River	40,000	75,000	65,000	35,000	50,000	70,000	50,000	55,000	40,000	72,000
Sechart Creek	75	200	400	200	25	200	200	75	50	140
Snug Basin Creek	200	1,500	750	750	200	1,500	1,500	2,500	900	1,700
Somass River	1,500	3,500	2,500	3,000	1,500	4,000	7,000	3,500	750	4,500
Sugsaw Creek	750	1,500	3,500	400	1,500	850	1,500	4,000	4,000	4,000
Toquart River	25,000	7,500	5,000	11,000	5,000	18,000	10,000	15,000	20,000	19,000
Two Rivers East	200	750	3,500	3,500	150	3,500	1,500	3,500	750	700
Two Rivers West	200	400	3,500	3,500	200	3,500	750	3,500	3,000	4,800
Uchuck Creek	1,500	3,500	7,500	7,500	7,500	3,500	5,500	10,000	6,000	4,400
Useless Creek	75	200	750	750	25	400	750	200	75	700
Vernon Creek	75	400	750	200	25	400	750	400	200	450
West Creek	750	7,500	3,500	7,500	3,500	3,500	3,500	3,500	3,000	3,500
Total	134,250	222,950	170,375	145,375	89,875	204,750	147,343	144,570	115,410	195,665

Appendix 2b (cont'd).

Area 23	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Canoe Pass Ck.	180	200	60	-	-	-				
Carnation Ck	1,100	1,200	400	3,000	2,300	1,600				
Cataract Creek	500	250	700	-	unk.	308				
China Creek	N.O	N.O.	N.O.	-	N.O.	-				
Cour D'Alene Cr.	200	200	75	-	75	N.O.				
Coleman Creek	30	N.O.	N.O.	-	N.O.	10				
Consinka Creek	900	1,000	200	-	N.O.	550				
Cous Creek	380	100	120	-	-	36				
Dutch H Cr. East	1,500	400	250	3,500	25	975				
Dutch H Cr. West	875	150	190	700	1	230				
Effingham R.	3,500	5,000	3,500	500	3,000	2,700				
Franklin River	100	N.O.	30	-	-	5				
Frederick Cr.	2,500	10,800	1,500	700	6,000	6,000				
Hendersen River	850	1,000	600	4,000	400	N.O.				
Hillier Creek	-	-	200	-	-	-				
Holford Creek	1,150	2,200	1,000	2,000	-	700				
Klanawa River	N.O.	N.O.	50	-	-	-				
Little Maggie R	180	50	80	-	-	-				
Little Toquart Cr.	6,500	350	400	200	-	1,500				
Lucky Creek	500	400	200	-	50	520				
Mactush Creek	-	N.O.	N.O.	-	-	-				
Maggie River	290	400	350	-	-	N.O.				
Mercantile Cr.	200	100	50	-	-	-				
Mercer Creek	550	500	200	100	-	-				
Nahmint River	25,000	25,000	4,000	30,000	16,600	37,500				
Pachena River	150	500	90	-	-	-				
Pipestem River	180	500	160	-	60	400				
Poett Nook Cr.	520	1,000	100	-	500	800				
Salmon Creek[d]	5,000	3,500	1,000	3,000	unk.	2,400				
Sandy Creek	280	200	120	-	-	-				
Sarita River	38,000	67,000	17,000	40,000	16,600	35,000				
Sechart Creek	80	100	30	-	6	-				
Snug Basin Cr	550	750	200	2,000	400	1,050				
Somass River	500	300	350	N.O.	1,000	N.O.				
Sugsaw Creek	6,000	14,000	2,000	11,000	7,000	3,200				
Toquart River	17,000	4,500	10,000	-	10,000	11,500				
Two Rivers East	500	50	350	-	-	300				
Two Rivers West	2,200	150	450	-	500	9,000				
Uchuck Creek	3,500	2,500	500	5,000	1,000	2,700				
Useless Creek	685	300	30	-	-	-				
Vernon Creek	2,700	400	750	-	-	-				
West Creek	3,200	5,000	1,500	10,000	2,000	-				
Total	128,030	150,050	48,785	115,700	67,517	118,984				

[a,b,c]As for Appendix 2a.

[d]Includes Thornton Creek, mainly hatchery returns.

Appendix 2c. Annual chum salmon escapements to individual streams in Area 24, 1947-1982.[a]

Area 24	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Atleo River	1,500	-[b]	750	7,500	3,500	7,500	3,500	7,500	7,500	7,500
Bawden Bay Creek	750	-	3,500	3,500	400	3,500	3,500	7,500	1,500	3,500
Bedwell River	1,500	-	1,500	3,500	750	1,500	1,500	7,500	1,500	3,500
Bulson Creek	-	-	-	-	-	-	-	-	-	-
Cecilia Creek	-	-	400	-	750	400	200	750	200	200
Cone Creeks	-	-	-	-	-	-	-	-	-	-
Cypre River	3,500	-	3,500	7,500	1,500	7,500	3,500	7,500	3,500	3,500
Hesquiat H. Creek	-	-	-	-	-	-	-	-	-	-
Hesquiat River	3,500	-	750	7,500	750	750	3,500	7,500	1,500	3,500
Hootla Kootla Cr.	-	-	-	-	-	-	-	-	-	-
Hot Springs Cove	400	-	1,500	7,500	400	1,500	750	3,500	200	400
Ice River	-	-	750	3,500	3,500	200	200	400	200	200
Kanim Creeks	-	-	-	-	-	-	-	-	-	-
Kennedy River lower	400	-	200	400	3,500	750	400	1,500	200	200
Kootowis Creek	750	-	75	750	200	750	750	1,500	200	200
Lost Shoe Creek	-	400	400	-	75	200	200	400	200	200
Meares Creek	-	-	1,500	-	-	-	-	-	-	-
Megin River	1,500	-	3,500	7,500	3,500	7,500	3,500	15,000	1,500	3,500
Moyeha River	1,500	-	2,000	7,500	3,500	15,000	3,500	15,000	1,500	3,500
Riley Cove Creek	-	-	75	-	200	750	200	1,500	200	75
South Bay Creeks	-	-	-	-	-	-	-	-	-	-
Sutton Mill Creek	750	-	75	750	200	200	400	1,500	200	400
Sydney River	750	-	750	3,500	1,500	750	400	400	200	400
Tofino Creek	1,500	-	1,500	3,500	7,500	3,500	1,500	3,500	750	200
Tranquil Creek	3,500	-	5,000	7,500	35,000	35,000	35,000	35,000	15,000	15,000
Warn Bay Creek	1,500	-	750	3,500	400	1,500	1,500	7,500	750	1,500
Watta Creek	1,500	-	750	750	1,500	200	1,500	1,500	750	750
Whitepine CoveCr.	750	-	100	3,500	400	400	400	1,500	200	200
Total	25,550	400	29,325	79,650	69,025	89,350	65,900	127,950	37,750	48,425

Appendix 2c (cont'd).

Area 24	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Atleo River	7,500	7,500	7,500	15,000	750	7,500	3,000	4,000	500	1,500
Bawden Bay Creek	3,500	3,500	3,500	15,000	750	7,500	600	2,000	250	200
Bedwell River	3,500	3,500	3,500	3,500	750	400	100	2,000	800	750
Bulson Creek	-	-	-	-	-	-	-	-	-	-
Cecilia Creek	200	750	750	750	200	400	200	200	50	N.O.[c]
Cone Creeks	-	-	-	-	-	-	-	-	-	400
Cypre River	3,500	3,500	7,500	7,500	1,500	7,500	2,000	5,000	1,200	750
Hesquiat H.Creeks	-	-	-	-	-	-	-	-	100	-
Hesquiat River	3,500	3,500	3,500	1,500	750	1,500	100	1,000	500	75
Hootla Kootla Cr.	-	-	-	-	-	-	-	-	-	-
Hotsprings C.Cr.	400	400	400	200	200	200	100	300	150	400
Ice River	750	3,500	1,500	3,500	750	1,500	800	800	600	400
Kanim Creeks	-	-	-	-	-	-	-	-	-	-
Kennedy River lower	400	750	750	200	200	200	N.O.	300	50	N.O.
Kootowis Creek	400	1,500	750	750	1,500	-	600	2,000	800	400
Lost Shoe Creek	200	200	200	25	200	75	25	25	75	75
Meares Creek	-	-	-	-	-	-	-	-	1,000	1,500
Megin River	3,500	7,500	7,500	15,000	3,500	7,500	1,000	2,000	400	75
Moyeha River	3,500	7,500	7,500	1,500	1,500	1,500	1,500	1,500	400	200
Riley Cove Creek	200	200	200	200	75	200	25	100	25	N.O.
South Bay Creeks	-	-	-	-	-	-	-	-	100	-
Sutton Mill Creek	750	1,500	750	1,500	400	750	400	2,000	200	1,500
Sydney River	400	750	750	3,500	3,500	1,500	1,000	1,100	100	200
Tofino Creek	200	1,500	400	750	200	200	100	200	50	N.O.
Tranquil Creek	15,000	15,000	7,500	7,500	7,500	7,500	2,000	3,000	600	1,500
Warn Bay Creek	1,500	1,500	1,500	3,500	400	1,500	1,000	3,000	400	1,500
Watta Creek	1,500	3,500	3,500	1,500	750	750	800	2,000	500	750
Whitepine C. Cr.	200	1,500	750	1,500	400	400	250	100	150	75
Total	50,600	69,050	60,200	84,375	25,775	48,575	15,600	32,625	9,000	12,250

Appendix 2c (cont'd).

Area 24	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Atleo River	1,500	18,500	3,500	3,500	1,500	58,000	15,000	25,000	9,000	18,000
Bawden Bay Creek	1,500	10,000	1,500	3,500	750	1,500	3,500	3,500	500	3,000
Bedwell River	400	1,400	400	400	750	1,500	750	500	2,800	900
Bulson Creek	25	25	25	-	-	-	-	-	-	-
Cecilia Creek	25	200	400	750	200	200	200	N.O.	200	75
Cone Creeks	750	3,000	1,500	2,500	400	1,500	1,500	2,000	1,100	1,000
Cypre River	3,500	5,100	3,500	750	400	3,500	3,500	1,500	1,200	1,200
Hesquiat Hbr.Crks	-	-	-	-	-	-	750	450	550	250
Hesquiat River	400	3,500	200	75	75	200	25	1,500	1,000	2,500
Hootla Kootla Ck.	-	35	N.O.	200	75	25	25	N.O.	N.O.	-
Hotsprings CoveCk.	200	2,000	3,500	3,500	3,500	1,500	1,500	600	500	500
Ice River	400	3,500	1,500	750	400	200	750	1,200	400	N.O.
Kanim Creeks	-	350	75	200	25	200	N.O.	-	-	-
Kennedy River Tower	N.O.	-	-	-	-	-	-	-	-	-
Kootowis Creek	750	2,700	750	3,500	200	750	400	1,500	2,500	50
Lost Shoe Creek	25	60	25	75	N.O.	N.O.	25	N.O.	-	N.O.
Meares Creek	3,500	2,500	3,500	3,500	750	750	1,500	1,200	300	550
Megin River	3,500	10,000	3,500	3,500	1,500	7,500	3,500	10,000	2,000	11,700
Moyeha River	1,500	7,500	1,500	1,500	3,500	3,500	7,500	9,500	6,000	6,800
Riley Cove Creek	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.
South Bay Creeks	-	-	-	-	-	-	-	-	-	-
Sutton Mill Creek	1,500	2,500	1,500	3,500	200	200	750	2,000	800	25
Sydney River	400	4,000	3,500	3,500	200	400	3,500	500	300	310
Tofino Creek	25	35	200	200	75	400	750	2,500	250	300
Tranquil Creek	7,500	5,500	3,500	1,500	1,500	3,500	1,500	7,000	4,500	2,550
Warn Bay Creek	1,500	2,500	1,500	3,500	750	3,500	3,500	4,500	2,500	1,300
Watta Creek	3,500	8,500	3,500	3,500	1,500	1,500	7,500	3,000	750	1,900
Whitepine CoveCk.	200	800	400	1,500	200	75	400	300	500	150
Total	32,600	94,205	39,475	45,400	18,450	90,401	58,325	78,250	37,650	53,060

Appendix 2c (cont'd).

Area 24	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Atleo River	27,000	35,000	9,000	34,000	30,000	18,000				
Bawden Bay Ck.	3,000	3,500	2,400	6,000	7,000	8,500				
Bedwell River	500	400	240	100	300	900				
Bulson Creek	-	-	-	-	-	-				
Cecilia Creek	200	400	250	400	500	100				
Close Cr. (Kennyon R)	-	-	-	100	-	-				
Cone Creeks	600	2,500	1,750	1,700	1,300	900				
Cypre River	4,000	5,000	850	5,000	2,300	4,000				
Hesquiat Hbr. Ck.	50	100	100	200	N.O.	100				
Hesquiat River	2,000	3,000	300	1,500	1,250	1,400				
Hootla Kootla Ck.	N.O.	-	N.O.	N.O.	N.O.	-				
Hotsprings Cove Ck.	400	600	175	2,000	82	350				
Ice River	750	2,000	250	650	400	1,100				
Kanim Creeks	-	-	-	-	-	-				
Lower Kennedy River	-	-	-	-	-	-				
Kootowis Creek	1,500	3,500	300	5,000	1,500	Unk				
Little Whitepine Cove Ck.	-	-	-	1,650	400	-				
Lost Shoe Creek	N.O.	N.O.	N.O.	70	N.O.	Unk				
Meares Creek	200	700	275	1,700	825	1,700				
Megin River	12,000	30,000	4,800	22,000	5,000	13,000				
Moyeha River	5,000	8,000	2,500	11,250	5,000	6,000				
Riley Cove Ck.	N.O.	-	-	-	-	-				
Sandhill Ck.	-	-	-	15	100	Unk.				
Sharpe Ck.	-	-	-	290	-	-				
South Bay Cks.	-	-	-	-	-	N.O.				
Sutton Mill Cks	200	1,200	960	2,150	400	300				
Sydney River	750	800	250	600	1,000	600				
Tofino Creek	250	75	25	50	100	100				
Tranquil Creek	4,000	5,000	1,850	7,800	3,000	6,000				
Warn Bay Creek	2,000	5,000	1,800	7,650	750	4,000				
Watta Creek	3,500	3,000	950	5,200	1,500	5,000				
Whitepine Cove	300	500	525	650	700	600				
Woman Is. Cks.	-	-	-	50	200	-				
Wood Is. Cks.	-	-	-	220	250	300				
Total	68,200	110,275	29,550	117,995	63,857	72,950				

a,b,c As for Appendix 2a.

Appendix 2d. Annual chum salmon escapements to individual streams in Area 25, 1947-1982.[a]

Area 25	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Apple Creek	-[b]	-	-	-	-	200	75	400	N.O.[c]	25
Bancroft Creek	-	-	-	-	-	-	750	-	-	-
Barr Creek	-	-	-	-	-	-	-	-	-	-
Brodick Creek	750	400	750	3,500	750	200	3,500	3,500	75	200
Burman River	3,500	3,500	3,500	7,500	3,500	15,000	7,500	7,500	3,500	15,000
Canton Creek	1,500	1,500	1,500	3,500	3,500	7,500	3,500	3,500	400	200
Chum Creek	-	-	-	7,500	2,000	3,500	7,500	7,500	1,500	750
Conuma River	3,500	3,500	3,500	7,500	7,500	7,500	3,500	7,500	1,500	3,500
Deserted Creek	1,500	3,500	1,500	7,500	1,500	3,500	7,500	1,500	750	3,500
Ehatisaht Creek	-	-	-	-	-	-	-	-	-	-
Eliza Creek	1,500	3,500	7,500	7,500	750	3,500	-	1,500	400	750
Escalante River	-	-	-	-	-	-	-	-	-	-
Espinoza Creek	3,500	3,500	3,500	3,500	750	1,500	7,500	750	1,500	1,500
Gold River	3,500	3,500	3,500	7,500	750	7,500	7,500	7,500	750	750
Hoiss Creek	1,500	3,500	750	1,500	400	400	3,500	750	200	3,500
Houston River	-	-	-	-	-	-	-	-	-	-
Inner Basin Rvrs	-	3,500	7,500	35,000	1,500	-	15,000	1,500	7,500	7,500
Jacklah River	-	-	-	-	200	750	750	400	-	75
Kendrick Creek	-	-	-	-	-	-	-	-	-	-
Kleeptee Creek	1,500	3,500	1,500	1,500	200	750	1,500	750	750	7,500
Leiner River	1,500	1,500	1,500	3,500	75	200	1,500	3,500	1,500	750
Little ZeballosR.	1,500	1,500	1,500	3,500	400	750	3,500	750	750	750
Lord Creek	-	-	-	-	-	1,500	1,500	750	25	200
Mamat Creek	1,500	1,500	3,500	3,500	750	1,500	3,500	1,500	25	75
Marvinus Bay Crk.	1,500	3,500	750	3,500	200	200	3,500	1,500	25	750
McCurdy Creek	-	-	-	-	200	-	200	200	200	25
Mooyah River	7,500	3,500	3,500	3,500	3,500	750	7,500	3,500	400	7,500
Muchalat River	-	-	-	-	-	-	-	-	-	-
Owossitsa Creek	750	200	1,500	3,500	3,500	200	7,500	1,500	400	200
Park River	3,500	7,500	3,500	1,500	1,500	3,500	1,500	3,500	1,500	1,500
Port Eliza Creek	1,500	3,500	7,500	1,500	1,500	1,500	3,500	3,500	25	200
Silverado Creek	-	-	-	-	1,500	1,500	750	750	25	1,500
Sucwoa River	750	750	1,500	1,500	200	750	1,500	750	400	400
Tahsis River	3,500	7,500	7,500	35,000	7,500	7,500	15,000	7,500	3,500	3,500
Tlupana River	1,500	3,500	1,500	1,500	750	1,500	1,500	750	200	75
Tsowwin River	7,500	7,500	3,500	7,500	3,500	7,500	3,500	7,500	400	400
Zeballos River	1,500	3,500	3,500	15,000	3,500	7,500	7,500	3,500	3,500	7,500
Total	56,250	78,850	75,750	178,000	51,875	88,150	133,025	85,500	31,700	70,075

Appendix 2d (cont'd).

Area 25	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Apple Creek	25	25	7	200	25	25	100	200	25	25
Bancroft Creek	-	-	-	-	-	-	-	-	-	-
Barr Creek	-	-	-	-	-	-	-	-	-	-
Brodick Creek	750	1,500	750	3,500	25	750	400	3,500	400	1,500
Burman River	3,500	7,500	750	15,000	3,500	7,500	9,000	5,500	3,500	4,000
Canton Creek	200	1,500	750	15,000	750	750	600	1,500	750	550
Chum Creek	3,500	3,500	1,500	7,500	3,500	15,000	6,000	3,500	3,500	6,000
Conuma River	3,500	7,500	3,500	35,000	3,500	750	3,000	7,000	3,500	6,000
Deserted Creek	1,500	3,500	3,500	15,000	750	7,500	6,000	7,500	3,500	6,500
Ehatisaht Creek	-	400	220	-	-	-	-	-	-	-
Eliza Creek	200	750	750	1,500	400	3,500	3,000	3,500	750	3,000
Escalante River	75	200	-	-	-	-	-	3,500	3,500	1,500
Espinoza Creek	3,500	3,500	3,500	7,500	3,500	750	3,000	1,500	1,500	1,500
Gold River	750	3,500	750	3,500	1,500	1,500	2,000	3,500	1,500	3,500
Hoiss Creek	1,500	3,500	400	3,500	750	1,500	700	400	400	2,000
Houston River	200	75	25	200	200	25	200	200	75	200
Inner Basin Rivers	750	1,500	15,000	7,500	35,000	15,000	12,000	15,000	7,500	12,000
Jacklah River	200	200	200	750	200	25	300	200	75	200
Kendrick Creek	-	1,500	400	-	-	-	-	-	-	-
Kleeptee Creek	3,500	750	400	15,000	3,500	750	800	1,500	3,500	3,000
Leiner River	1,500	3,500	3,500	3,500	1,500	750	5,000	7,500	1,500	6,000
Little Zeballos R.	750	750	400	3,500	750	400	1,500	3,500	750	600
Lord Creek	750	1,500	400	3,500	200	200	300	25	25	400
Mamat Creek	750	1,500	1,500	3,500	1,500	750	700	750	400	3,500
Marvinus Bay Ck.	400	1,500	200	7,500	1,500	400	400	750	400	1,800
McCurdy Creek	75	25	12	200	-	-	-	25	-	25
Mooyah River	1,500	7,500	400	15,000	7,500	3,500	3,000	3,500	750	4,000
Muchalat River	-	-	-	-	-	-	-	-	-	-
Ovossitsa Creek	1,500	3,500	3,500	15,000	3,500	1,500	1,800	1,500	400	750
Park River	750	3,500	3,500	15,000	3,500	3,500	8,000	7,500	7,500	10,000
Port Eliza Creek2	200	3,500	750	7,500	1,500	400	1,500	3,500	400	2,500
Silverado Creek	1,500	3,500	400	7,500	1,500	75	600	750	400	750
Sucwoa River	400	1,500	400	15,000	1,500	3,500	4,000	3,500	1,500	3,000
Tahsis River	3,500	7,500	7,500	35,000	7,500	3,500	15,000	15,000	3,500	7,500
Tlupana River	200	750	200	1,500	400	75	200	400	200	1,500
Tsowwin River	3,500	7,500	3,500	15,000	15,000	3,500	12,000	15,000	3,500	8,000
Zeballos River	3,500	15,000	15,000	15,000	3,500	3,500	3,000	2,500	3,500	8,000
Total	44,425	103,425	73,560	293,850	107,950	80,875	104,100	123,700	58,700	109,800

Appendix 2d (cont'd).

Area 25	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Apple Creek	N.O.	200	200	N.O.	-	N.O.	-	25	75	25
Bancroft Creek	-	-	-	-	-	-	-	-	-	-
Barr Creek	400	25	N.O.	150	-	200	75	75	25	-
Brodick Creek	750	750	75	500	200	750	1,500	750	200	400
Burman River	12,000	7,500	7,500	3,000	6,700	1,350	7,500	7,500	7,500	7,500
Canton Creek	900	3,500	3,500	700	500	3,500	750	3,500	1,500	400
Chum Creek	1,500	1,500	1,500	5,500	1,500	750	1,500	750	400	75
Conuma River	7,000	10,000	3,500	6,500	3,500	15,000	7,500	7,500	7,500	3,500
Deserted Creek	4,000	3,500	7,500	3,500	3,500	3,500	3,500	3,500	3,500	-
Ehatisaht Creek	200	75	25	200	25	-	400	400	75	-
Eliza Creek	400	1,500	1,500	5,500	750	1,500	3,500	3,500	200	75
Escalante River	-	-	-	-	-	-	-	-	-	-
Espinosa Creek	1,500	400	750	600	750	3,500	3,500	1,500	750	400
Gold River	3,000	1,500	3,500	6,000	1,000	6,000	7,500	1,500	7,500	25
Hoiss Creek	1,500	400	750	2,200	200	3,500	1,500	750	75	-
Houston River	200	25	200	800	75	750	200	75	-	-
Inner Basin Rivers	15,000	7,500	7,500	15,000	7,500	4,000	15,000	3,500	3,500	750
Jacklah River	200	200	400	200	75	750	400	200	750	-
Kendrick Creek	750	1,500	1,500	4,000	750	2,100	750	400	200	25
Kleeptee Creek	1,500	1,500	1,500	5,000	750	3,500	1,500	1,500	200	-
Leiner River	1,500	5,000	7,500	15,000	13,000	17,500	15,000	15,000	3,500	7,500
Little Zeballos R.	400	1,500	400	400	25	1,200	1,500	3,500	75	1,500
Lord Creek	400	400	750	400	750	1,000	400	750	75	400
Mamat Creek	750	750	400	1,500	750	20	7,500	750	200	-
Marvinus Bay Crk.	750	750	400	2,000	200	1,500	-	25	75	25
McCurdy Creek	-	-	-	-	-	-	-	-	-	-
Mooyah River	1,500	3,500	3,500	2,500	750	3,000	3,500	750	1,500	-
Muchalat River	-	-	-	-	-	-	-	-	-	25
Owossitsa Creek	400	200	25	1,200	400	3,500	7,500	400	25	750
Park River	7,000	3,500	7,500	6,000	2,100	3,500	15,000	3,500	750	1,500
Port Eliza Creek2	1,500	750	1,500	1,500	200	-	750	1,500	200	25
Silverado Creek	750	1,500	750	800	200	1,500	1,500	-	200	-
Sucwoa River	3,500	3,500	5,000	8,000	1,500	7,500	15,000	3,500	3,500	750
Tahsis River	7,500	10,000	7,500	15,000	15,000	18,000	35,000	15,000	7,500	7,500
Tlupana River	400	3,500	3,500	6,000	1,500	3,000	3,500	3,500	3,500	200
Tsowwin River	7,500	7,500	7,500	7,500	3,500	15,000	7,500	7,500	7,500	1,500
Zeballos River	3,500	3,500	1,500	5,000	1,500	15,000	15,000	7,500	3,500	1,500
Total	88,150	87,425	89,125	132,150	69,150	141,970	185,225	100,100	66,050	36,350

Appendix 2d (cont'd).

Area 25	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Apple Creek	-	-	-	-	-	-				
Bancroft Creek	-	-	-	-	-	-				
Barr Creek	-	600	600	-	-	-				
British Creek	-	-	-	400	-	-				
Brodick Creek	100	400	242	750	-	-				
Burman River	3,500	6,500	720	3,000	7,600	7,500				
Canton Creek	500	800	140	5,000	7,000	8,000				
Chum Creek	3,000	3,000	130	1,500	500	-				
Conuma River	4,300	7,500	2,648	18,000	30,000	40,000				
Demikosse Creek	-	-	-	-	300	ND				
Deserted Creek	6,000	9,000	7,000	20,000	9,000	19,000				
Ehatisaht Creek	1,000	530	3	-	-	-				
Eliza Creek	3,000	3,000	642	1,400	-	6,500[d]				
Escalante River	-	-	10	-	-	-				
Espinosa Creek	3,000	12,000	1,750	3,500	3,000	2,500				
Gold River	4,000	3,500	130	1,000	2,290	3,500				
Guise Creek	-	-	-	150	-	-				
Hammond Creek	-	-	-	-	800	-				
Hoiss Creek	150	300	110	500	1,500	2,500				
Houston River	50	-	-	-	-	-				
Inner Basin Rvrs.	ND.	4,500	5,300	4,000	-	9,000				
Jacklah River	100	100	NO	-	-	-				
Kendrick Creek	-	-	-	-	-	-				
Kleeptee Creek	500	850	250	400	1,000	3,500				
Leiner River	4,700	9,000	3,750	5,000	5,000	7,500				
Little Zeballos R.	500	2,000	400	3,200	200	1,500				
Lord Creek	-	800	-	-	-	1,500				
Mamat Creek	300	550	94	1,100	280	1,750				
Marvinus Bay Ck.	75	75	-	-	-	100[d]				
McCurdy Creek	-	-	-	-	-	-				
Moovah River	1,000	1,400	250	2,000	900	-				
Muchalat River	-	-	-	-	300	-				
Owossitsa Creek	1,000	5,000	2,022	6,600	1,000	-				
Park River	2,500	18,000	6,190	12,000	6,000	7,500				
Port Eliza Ck.	200	1,000	645	900	4,500	1,000				
Silverado Ck.	100	50	-	-	50	-				
Sucwoa River	3,500	-	1,600	11,000	10,000	9,000				
Tahsis River	5,500	9,500	3,680	-	7,000	11,000				
Tlupana River	1,000	3,500	200	10,000	8,000	7,000				
Tsowwin River	500	2,500	1,600	5,900	4,000	4,500				
Zeballos River	5,000	10,000	700	8,500	7,000	11,000				
Total	55,075	115,950	40,806	125,800	117,220	165,350				

[a,b,c] As for Appendix 2a.
[d] Loggers' estimate.

Appendix 2e. Annual chum salmon escapements to individual streams in Area 26, 1947-1982.[a]

Area 26	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Amai Creek	3,500	3,500	3,500	7,500	3,500	7,500	3,500	3,500	1,500	750
Artlish River	750	3,500	750	3,500	200	3,500	1,500	5,500	1,500	1,500
Battle River	1,500	1,500	3,500	3,500	1,500	3,500	3,500	2,500	25	1,500
Cachalot Creek	-[b]	-	-	-	-	-	-	-	-	-
Chamiss Creek	3,500	3,500	7,500	7,500	7,500	7,500	7,500	8,490	3,500	7,500
Clanninick Creek	3,500	3,500	15,000	15,000	3,500	3,500	3,500	7,500	750	1,500
Easy Creek	3,500	3,500	7,500	7,500	3,500	3,500	3,500	2,120	400	1,500
Elaine Creek	-	-	-	3,500	1,500	400	1,500	750	25	200
Jansen Lake Crk.	200	400	200	400	200	750	400	119	N.O.[c]	25
Kaouk Creek	750	3,500	750	1,500	750	3,500	3,500	3,500	750	3,500
Kapoose Creek	-	-	-	-	-	-	-	-	-	-
Kashutl River	3,500	3,500	7,500	7,500	3,500	7,500	3,500	3,500	400	1,500
Kauwinch River	7,500	7,500	15,000	15,000	3,500	7,500	7,500	3,500	3,500	1,500
Malksope River	7,500	3,500	3,500	15,000	7,500	15,000	7,500	3,500	3,500	7,500
McKay Cove Creek	3,500	1,500	3,500	3,500	3,500	3,500	3,500	1,500	1,500	750
Narrowgut Creek	3,500	3,500	3,500	7,500	3,500	7,500	3,500	2,760	75	750
Nasparti River	3,500	3,500	400	-	3,500	3,500	1,500	2,500	400	3,500
Ououkinish River	3,500	1,500	3,500	15,000	1,500	7,500	3,500	3,500	750	1,500
Power River	750	3,500	3,500	3,500	750	3,500	3,500	1,500	-	750
Tahsish River	7,500	7,500	15,000	-	7,500	15,000	15,000	7,500	7,500	3,500
Tatchu Creek	-	-	-	-	-	-	-	-	-	-
Yaku Bay Creek	-	-	-	-	-	-	-	-	-	-
Total	57,950	58,400	94,100	116,900	56,900	104,150	77,400	63,739	26,075	39,225

Area 26	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Amai Creek	3,500	7,500	1,500	3,500	750	3,500	400	750	400	400
Artlish River	1,500	3,500	400	400	750	750	400	N.O.	750	200
Battle River	7,500	3,500	400	1,500	400	75	200	200	400	400
Cachalot Creek	-	1,500	200	750	200	200	75	750	400	750
Chamiss Creek	7,500	15,000	7,500	3,500	3,500	3,500	400	3,500	3,500	3,500
Clanninick River	7,500	15,000	3,500	15,000	1,500	1,500	750	1,500	3,500	35,000
Easy Creek	3,500	3,500	3,500	3,500	1,500	750	400	3,500	3,500	3,500
Elaine Creek	750	1,500	75	200	400	25	75	750	400	200
Jansen Lake Creek	25	N.O.	N.O.	25	25	N.O.	N.O.	N.O.	-	750
Kaouk Creek	3,500	3,500	750	1,500	750	750	750	75	750	750
Kapoose Creek	-	-	-	-	-	-	N.O.	-	-	-
Kashutl River	3,500	7,500	3,500	3,500	1,500	1,500	750	3,500	1,500	7,500
Kauvinch River	7,500	3,500	1,500	3,500	1,500	1,500	400	1,500	1,500	1,500
Malksope River	3,500	15,000	7,500	7,500	750	7,500	1,500	7,500	7,500	7,500
McKay Cove Creek	3,500	3,500	3,500	3,500	750	3,500	75	400	750	400
Narrowgut Creek	3,500	3,500	1,500	1,500	1,500	1,500	400	7,500	1,500	750
Nasparti River	1,500	1,500	750	750	200	750	25	N.O.	200	750
Ououkinish River	3,500	3,500	1,500	3,500	400	3,500	400	750	400	1,500
Power River	3,500	750	400	750	400	1,500	200	400	750	400
Tahsish River	7,500	15,000	15,000	7,500	3,500	3,500	3,500	3,500	3,500	7,500
Tatchu Creek	-	-	-	-	-	-	-	-	-	-
Yaku Bay Creek	1,610	1,500	750	750	75	N.O.	N.O.	200	75	200
Total	74,385	109,750	53,725	62,625	20,350	35,800	10,700	36,275	31,275	73,450

Appendix 2e (cont'd).

Area 26	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Amai Creek	400	750	75	400	200	400	1,500	400	-	200
Artlish River	1,500	1,500	75	750	400	750	3,500	750	750	200
Battle River	200	750	200	200	N.O.	400	400	25	-	-
Cachalot Creek	400	400	25	25	400	1,500	1,500	1,500	400	75
Chamiss Creek	3,500	7,500	3,500	15,000	3,500	15,000	15,000	7,500	3,500	3,500
Clanninick Creek	3,500	3,500	1,500	7,500	3,500	7,500	7,500	7,500	3,500	25
Easy Creek	1,500	3,500	1,500	7,500	3,500	N.O.	1,500	400	25	75
Elaine Creek	75	400	400	750	400	750	750	25	N.O.	25
Jansen Lake Creek	25	400	25	25	-	-	-	-	-	-
Kaouk Creek	750	750	750	3,500	7,500	11,000	15,000	3,500	7,500	3,500
Kapoose Creek	-	-	-	-	-	-	-	-	-	-
Kashutl River	3,500	3,500	3,500	7,500	3,500	750	3,500	7,500	400	400
Kauwinch River	3,500	400	750	3,500	7,500	13,000	1,500	1,500	3,500	1,500
Malksope River	1,500	7,500	15,000	35,000	15,000	13,000	15,000	7,500	3,500	1,500
McKay Cove Creek	750	750	400	3,500	1,500	3,500	3,500	1,500	750	75
Narrowgut Creek	1,500	1,500	1,500	3,500	750	1,500	3,500	750	750	400
Nasparti River	750	400	1,500	750	750	2,000	3,500	1,500	1,500	200
Ououkinish River	3,500	400	7,500	3,500	3,500	3,500	15,000	3,500	3,500	400
Power River	400	400	200	200	750	200	200	25	200	200
Tahsish River	7,500	3,500	7,500	15,000	15,000	31,000	7,500	7,500	3,500	1,500
Tatchu Creek	-	-	-	-	-	400	-	-	200	200
Yaku Bay Creek	400	200	200	200	N.O.	200	75	750	-	-
Total	35,150	38,000	46,100	108,300	67,650	106,350	99,925	53,625	33,475	13,975

Area 26	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Amai Creek	-	2,500	304	4,000	1,000	2,000				
Artlish River	400	2,100	500	4,000	2,000	1,000				
Battle River	NO	2,500	100	-	NO	-				
Blowhole Creek	-	-	250	-	-	-				
Cachalot Creek	-	500	400	1,000	800	1,000				
Chamiss Creek	1,500	12,000	3,600	10,000	2,000	-				
Clanninick Ck	1,500	9,500	510	7,000	3,000	-				
Easy Creek	NO	5,000	1,530	2,000	-	8,000				
Elaine Creek	200	500	-	400	500	-				
Jansen Lake Ck.	-	-	-	100	-	-				
Kaouk Creek	1,000	6,500	1,300	7,500	8,000	10,000				
Kapoose Creek	50	-	-	-	-	-				
Kashutl Creek	1,500	4,500	350	5,000	2,000	11,000				
Kauwinch River	NO	5,500	1,400	4,000	4,500	25,000				
Malksope River	1,000	8,000	270	10,000	10,000	8,000				
McKay Cove Ck.	300	800	500	1,000	1,000	-				
Narrowgut Creek	1,500	2,000	500	1,500	2,000	1,000				
Nasparti River	300	7,000	-	2,000	-	-				
Ououkinish River	2,000	7,000	274	1,500	2,700	6,000				
Power River	300	80	700	1,500	500	200				
Soatwoon	-	-	25	-	-	-				
Tahsish River	5,000	2,500	2,000	10,000	10,000	18,000				
Tatchu River	-	6	200	NO	-	-				
Yaku Bay Creek	-	1,000	10	1,500	-	-				
Total	16,550	84,486	14,723	74,000	50,000	91,200				

a,b,cAs for Appendix 2a.

Appendix 2f. Annual chum salmon escapements to individual streams in Area 27, 1947-1982.[a]

Area 27	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
Bear Creek	3,500	-	-[b]	-	3,500	-	-	-	300	4,000
Bish Creek	750	400	-	-	350	-	1,500	600	N.O.	200
Buck Creek	-	-	-	-	-	-	-	-	300	-
Canoe Creek	750	-	900	1,000	700	-	500	400	750	200
Cape Cook Creek	-	-	-	-	-	-	-	-	-	-
Cape Scott Creek	-	-	-	-	-	-	-	-	-	400
Cayeghle Creek	-	-	-	-	-	-	-	-	-	3,500
Cayuse Creek	200	450	-	-	950	-	-	300	400	200
Cleagh Creek	400	400	-	490	430	-	500	300	-	200
Cleaklagh Creek	-	-	3,100	-	3,000	-	-	-	75	400
Coatkwaus Creek	400	600	-	-	650	-	-	300	-	-
Colonial Creek	-	1,000	-	-	2,000	-	-	1,500	75	3,500
Cullect Creek	-	-	-	-	-	-	-	-	-	-
Dunad Creek	-	-	-	-	4,000	-	-	-	750	7,500
Dominic Creek	-	-	-	3,500	2,400	-	1,500	2,100	N.O.[c]	75
East Creek	-	-	3,500	1,950	1,800	-	1,500	900	750	400
Fisherman River	-	-	-	3,500	750	-	3,000	2,700	400	1,500
Gelato Creek	-	-	3,500	-	4,000	-	-	-	200	750
Glerup Creek	-	-	-	-	-	-	-	-	N.O.	-
Goodspeed River	-	-	-	-	5,000	-	-	-	7,500	200
Hathaway Creek	-	-	1,000	-	2,300	-	-	-	200	3,500
Hawiznakwi Creek	-	-	-	-	-	-	-	-	400	-
Head Creeks	-	-	-	550	1,500	-	1,000	750	750	1,500
Hushamu Creek	-	-	-	-	-	-	-	-	200	-
Jim's Creek	-	-	11,000	1,500	1,700	-	4,000	3,000	1,500	1,500
Johnny Creek	-	-	1,100	-	2,500	-	-	-	75	75
Keith River	-	-	2,000	7,600	3,700	-	4,000	5,000	400	1,500
Kewquodie Creek	7,500	3,500	-	1,500	3,500	-	1,500	1,000	750	3,500
Kleskish River	-	-	1,100	10,000	3,500	-	3,500	2,500	200	1,500
Kleyina Creek	-	-	-	-	4,000	-	-	-	200	3,500
Klootchlimmis Creek	3,500	3,500	-	-	3,500	-	1,500	1,500	N.O.	750
Koprino River	7,500	2,000	-	-	3,500	-	3,000	2,500	100	2,000
Kwatleo Creek	-	-	3,400	1,600	5,000	-	3,000	2,000	400	750
Kwokwesta Creek	3,500	2,000	-	-	1,500	-	2,500	4,000	250	200
Leeson Creek	-	-	700	-	800	-	-	-	200	750
Lewis Creek	-	-	-	-	100	-	-	-	50	50
Lower Ahnhichaelth[d]	3,500	-	-	-	4,500	-	-	-	30	1,500
Macjack River	-	-	-	-	-	-	3,500	2,500	-	-
Mahatta Creek	25	75	-	450	1,100	-	1,000	500	75	1,500
Marble River	1,500	2,500	-	-	1,000	-	-	1,000	400	1,000
McNiffe Creek	1,500	600	-	-	750	-	700	400	300	500
Monkey Creek	1,500	25	-	3,500	3,500	-	2,500	10,000	400	2,000
Montgomery Creek	-	-	-	-	-	-	-	-	-	1,200
Nequiltpaalis Ck.	-	-	75	-	100	-	-	100	25	400
Nuknimish Creek	-	-	1,100	-	2,300	-	-	-	N.O.	250
Pagattem Creek	-	-	-	-	450	-	-	-	50	350
Quashtin Creek	-	-	-	-	400	-	-	-	200	400
Quatsino Sound Ck.:										
1) Julian Ck.	-	-	-	-	-	-	-	-	-	-
2) Sawmill Ck.	-	-	-	-	-	-	-	-	-	-
3) Nahwhieclass Ck.	-	-	-	-	-	-	-	-	-	-
Roaring Creek	-	-	-	-	-	-	-	-	-	-
Rupert Creek	3,500	2,500	-	-	7,500	-	-	2,000	75	3,500
San Josef Creek	-	-	-	3,500	1,500	-	2,000	3,500	400	2,000
Stephan's Creek	-	-	-	-	1,000	-	-	-	100	750
Toeta Creek	-	300	-	-	-	-	-	-	100	300
Upper Ahnhichaelth[d]	1,500	-	-	-	3,000	-	-	-	200	200
Utlah Creek	-	-	-	-	-	-	-	-	100	-
Wanokana Creek	-	-	-	-	600	-	-	-	100	-
Washlawlis Creek	750	400	-	-	-	-	-	500	100	500
Waukwaas Creek	-	-	-	-	-	-	-	-	100	350
Youghpan Creek	-	-	-	-	-	-	-	-	150	-
Total	41,775	20,230	32,475	40,640	96,380	-	42,200	51,850	20,080	41,100

Appendix 2f (cont'd).

Area 27	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Bear Creek	6,000	3,000	300	400	600	300	400	700	400	3,500
Bish Creek	200	25	200	1,500	200	75	200	1,400	75	400
Buck Creek	750	750	25	N.O.	N.O.	400	25	30	25	N.O.
Canoe Creek	25	75	75	75	25	25	25	100	75	75
Cape Cook Creek	-	750	-	-	75	-	-	-	-	N.O.
Cape Scott Creek	N.O.	75	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	-	-
Cayeghle Creek	400	400	400	175	150	100	750	100	25	400
Cayuse Creek	200	200	75	25	25	25	25	25	25	75
Cleogh Creek	200	200	N.O.	-	25	25	75	80	N.O.	200
Cleeklagh Creek	75	200	25	25	25	25	25	25	25	25
Coetkwaus Creek	-	-	-	-	-	-	-	-	-	-
Colonial Creek	1,500	1,500	75	200	3,500	25	75	6,000	750	N.O.
Cullaat Creek	200	-	-	-	-	-	-	-	-	N.O.
Donad Creek	7,500	1,500	200	1,500	400	750	750	1,000	200	75
Dominic Creek	25	1,500	200	25	400	75	-	500	-	1,500
Enat Creek	750	75	100	200	75	200	25	250	N.O.	1,500
Fisherman River	750	1,500	200	25	-	75	1,500	200	-	N.O.
Galeto Creek	1,500	200	75	25	400	25	75	200	200	200
Glerup Creek	25	-	-	25	25	-	-	-	N.O.	N.O.
Goodspeed River	1,500	750	1,500	25	75	75	400	6	-	200
Hathaway Creek	750	200	200	200	400	25	75	50	400	200
Hovisnakwi Creek	-	25	25	25	-	25	25	300	25	75
Head Creeks	750	400	200	75	25	200	200	1,300	750	400
Hushamu Creek	200	25	25	25	N.O.	-	25	25	30	N.O.
Jim's Creek	7,500	3,500	1,500	1,500	750	1,500	750	1,500	1,500	750
Johnny Creek	25	25	25	25	N.O.	25	25	N.O.	25	25
Keith River	750	750	200	N.O.	-	750	25	29	25	-
Kewquodle Creek	1,500	750	200	200	400	75	25	400	75	200
Klaskish River	3,500	750	400	100	100	50	25	350	75	750
Kleyima Creek	7,500	3,500	3,500	1,500	400	750	1,500	7,000	400	7,500
Kloatchlumnis Ck.	400	400	1,500	200	200	400	400	4,000	400	200
Koprino River	3,000	3,000	800	1,000	600	900	750	500	200	600
Kwatleo Creek	8,000	7,500	400	800	6,000	700	200	6,000	7,500	3,500
Kwakwasta Creek	400	2,000	500	200	70	100	400	700	75	200
Leeson Creek	3,500	1,000	250	75	50	350	75	150	25	150
Lewis Creek	45	-	-	10	40	-	25	-	-	N.O.
Lower Ahnhichaelis	1,500	700	700	200	1,000	200	-	500	200	1,500
Macjack River	-	-	3,500	-	100	-	-	-	-	N.O.
Mahatta Creek	200	75	75	25	-	25	400	200	-	N.O.
Marble River	400	500	200	N.O.	-	100	400	300	25	N.O.
McNiffe Creek	150	300	100	20	20	45	25	30	2	400
Monkey Creek	1,000	100	100	150	300	30	400	3,000	400	25
Montgomery Creek	1,500	1,500	400	200	750	750	400	400	25	3,500
Nequiltpaalis Ck.	75	200	25	25	25	25	25	N.O.	N.O.	N.O.
Nuknimish Creek	150	150	50	10	125	50	25	2	3	75
Pegattern Creek	75	75	50	N.O.	20	30	25	-	N.O.	N.O.
Quashtin Creek	3,500	2,000	100	30	800	300	200	250	200	750
Quatsino Sound Ck:										
1) Julian Creek	-	-	-	-	-	-	-	-	-	-
2) Sawmill Creek	-	-	-	-	-	-	-	-	-	-
3)Nahwhiaclas Ck.	-	-	-	-	-	-	-	-	-	-
Running Creek	-	-	-	-	-	-	-	-	-	-
Rupert Creek	1,500	1,500	150	25	25	200	400	-	-	-
San Josef River	2,000	1,000	500	100	100	500	200	50	-	750
Stephen's Creek	500	600	200	200	3,000	500	400	800	200	400
Toots Creek	150	800	250	25	50	50	200	200	25	N.O.
Upper Ahnhichaelis	400	400	500	200	200	100	25	50	200	25
Utluh Creek	-	250	500	20	N.O.	-	-	25	N.O.	N.O.
Wanokana Creek	100	150	100	30	25	-	N.O.	25	25	75
Washlawlis Creek	50	325	100	25	25	40	75	30	N.O.	200
Woukonna Creek	150	350	200	200	100	100	25	8	400	25
Youghpon Creek	-	50	N.O.	20	25	-	N.O.	70	25	25
Total	72,820	47,350	29,975	11,665	21,700	11,095	12,100	38,838	15,030	30,250

Appendix 2f (cont'd).

Area 27	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Beer Creek	25	4,000	200	5,000	200	2,500	500	400	200	25
Bish Creek	N.O.	300	400	1,500	25	400	400	N.O.	N.O.	N.O.
Buck Creek	N.O.	-	-	200	25	25	25	N.O.	400	200
Canoe Creek	75	1,200	200	400	25	2,000	75	N.O.	N.O.	3,500
Cape Cook Creek	N.O.	-	-	200	25	-	-	-	200	-
Cape Scott Creek	25	N.O.	N.O.	N.O.	N.O.	N.O.	-	-	N.O.	-
Cayeghle Creek	6,500	4,000	1,500	3,500	8,000	8,000	20,000	20,000	3,500	3,500
Cayuse Creek	25	N.O.	200	75	200	1,000	200	200	75	200
Cleagh Creek	N.O.	100	400	750	25	200	75	-	N.O.	N.O.
Cleeklagh Creek	N.O.	80	75	400	400	200	1,000	3,500	1,500	750
Coatlenuus Creek	-	-	200	75	25	25	75	25	N.O.	N.O.
Colonial Creek	400	500	400	1,500	2,000	5,000	1,500	8,000	400	750
Colleot Creek	N.O.	-	-	-	-	-	-	75	200	N.O.
Donad Creek	200	2,300	200	3,500	200	2,000	1,000	3,500	750	25
Dominic Creek	75	1,500	400	750	400	1,500	N.O.	400	N.O.	25
East Creek	25	450	75	N.O.	25	2,000	25	N.O.	750	3,500
Fisherman River	-	400	200	-	25	400	N.O.	200	-	N.O.
Galato Creek	N.O.	500	400	400	75	400	200	400	200	N.O.
Glerup Creek	N.O.	N.O.	25	200	25	N.O.	75	200	25	25
Goodspeed River	25	4	25	1,500	400	3,000	1,500	75	400	200
Hathaway Creek	25	500	200	200	750	750	400	75	200	25
Hawisnakwa Creek	N.O.	60	25	25	25	75	400	N.O.	N.O.	N.O.
Head Creeks	25	800	1,500	750	25	1,400	400	N.O.	750	75
Hushamu Creek	N.O.	6	N.O.	25	N.O.	25	100	-	25	N.O.
Jim's Creek	400	3,800	3,500	1,500	100	8,000	3,000	-	400	3,500
Johnny Creek	N.O.	12	25	300	200	1,300	100	,000	750	200
Keith River	N.O.	-	-	-	25	500	N.O.	-	750	0
Kevequodie Creek	1,500	450	1,500	750	75	750	3,000	750	75	25
Klaskish River	75	800	400	400	25	5,000	1,500	-	750	750
Klayina Creek	400	2,000	400	1,000	200	2,000	400	5,000	200	N.O.
Klootchlimmis Ck.	200	1,200	1,500	750	200	750	750	2,000	750	750
Koprino River	400	3,500	200	200	200	7,000	400	1,000	400	75
Kwatleo Creek	200	3,200	750	3,500	100	4,000	750	1,000	200	200
Kwokwesta Creek	75	1,000	1,500	1,500	750	1,500	2,500	2,000	75	75
Leeson Creek	25	800	25	75	25	750	500	200	750	25
Lewis Creek	N.O.	12	N.O.	75	N.O.	25	75	200	75	-
Lower Ahwhichkoltp	25	400	400	400	200	1,500	200	-	N.O.	N.O.
Maclark River	-	-	-	-	200	N.O.	-	N.O.	N.O.	N.O.
Mahatta Creek	25	150	-	N.O.	N.O.	200	N.O.	75	25	N.O.
Marble River	25	250	200	750	900	2,000	4,000	750	75	750
McNiffe Creek	20	70	750	75	50	200	N.O.	200	N.O.	N.O.
Monkey Creek	75	300	750	75	200	1,200	400	1,000	200	200
Montgomery Creek	N.O.	300	400	1,500	200	200	300	500	N.O.	200
Nequilitpaalis Ck.	25	N.O.	N.O.	200	N.O.	25	25	25	N.O.	N.O.
Nukumigh Creek	25	10	25	25	25	25	50	25	25	N.O.
Pegetten Creek	N.O.	45	N.O.	75	75	400	75	300	200	25
Quashtin Creek	75	450	200	400	25	800	200	25	N.O.	N.O.
Quatsino S. Creeks:										
1) Julian Creek	-	-	400	200	75	750	1,000	200	75	25
2) Sawmill Creek	-	-	25	N.O.	N.O.	N.O.	50	N.O.	N.O.	N.O.
3)Mahwhieclas Ck.	-	-	75	25	25	75	100	50	25	-
Bonning Creek	-	-	-	-	-	N.O.	N.O.	-	-	-
Rupert Creek	-	-	-	-	-	25	400	-	-	-
San Josef Creek	-	300	200	-	-	200	N.O.	N.O.	-	N.O.
Stephan's Creek	75	1,000	200	5,000	600	2,500	1,000	3,500	1,500	200
Tsoda Creek	25	40	200	75	75	4,000	1,500	1,000	75	N.O.
Upper Ahwhichkoltp	N.O.	80	75	25	25	75	N.O.	25	N.O.	N.O.
Utluh Creek	400	450	N.O.	d	d	d	10,000	-	-	-
Wanokana Creek	N.O.	125	25	75	75	N.O.	N.O.	25	25	25
Washlawlis Creek	N.O.	60	75	-	N.O.	N.O.	N.O.	N.O.	25	-
Woulwaas Creek	25	500	400	75	400	25	1,500	75	75	200
Youghpon Creek	N.O.	12	N.O.	25	N.O.	N.O.	50	N.O.	N.O.	N.O.
Total	11,518	38,036	20,825	40,000	17,930	76,675	61,775	66,975	17,075	20,175

Appendix 2f (cont'd).

Area 27	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Bear Creek	250	75	50	150	200	750				
Bish Creek	N.O.	-								
Buck Creek	N.O.	-	350	N.O.	N.O.	N.O.				
Canoe Creek	-	200	-	750	-	100				
Cape Cook Creek	N.O.	-	-	-	-	-				
Cape Scott Creek	-	-	-	-	-	N.O.				
Cayeghle Creek	4,000	3,500	3,000	8,000	4,600	6,000				
Cayuse Creek	10	N.O.	N.O.	N.O.	150	50				
Cleagh Creek	N.O.	25	N.O.	N.O.	75	N.O.				
Cleaklagh Creek	85	750	1,000	1,500	1,000	2,000				
Coetkwaus Creek	28	75	30	150	75	100				
Colonial Creek	1,500	1,500	300	3,500	4,500	5,000				
Culleet Creek	N.O.	N.O.	N.O.	N.O.	N.O.	-				
Denad Creek	170	1,500	300	4,000	1,500	3,000				
Dominic Creek	10	75	-	-	-	-				
East Creek	200	750	-	3,500	-	N.O.				
Fisherman River	-	-	-	-	-	-				
Galato Creek	150	200	75	25	115	2,500				
Glerup Creek	125	200	50	25	40	1,500				
Goodspeed River	200	600	200	400	300	3,000				
Hathaway Creek	1,050	750	25	25	100	3,500				
Hawiznakwi Creek	N.O.	N.O.	3	- 0	3	-				
Head Creeks	1,060	1,500	100	2,500	150	5,000				
Hushamu Creek	N.O.	N.O.	N.O.	N.O.	N.O.	-				
Ilstad Creek	0	0	0	15	0	-				
Jim's Creek	1,500	25	1,500	25,000	1,000	2,000				
Johnny Creek	1,800	750	4,000	6,000	1,000	6,000				
Keith River	N.O.	-	-	500	-	N.O.				
Kewquodle Creek	N.O.	N.O.	30	N.O.	50	-				
Kleanish River	-	750	800	1,500	300	N.O.				
Klavins Creek	850	200	25	8,000	2,000	2,000				
Kloetchlimmis Ck	450	N.O.	200	750	100	-				
Koprino River	900	750	400	400	3,000	3,500				
Kwatleo Creek	350	1,500	50	1,500	500	5,000				
Kwakiveeta Ck.	350	200	200	1,500	150	800				
Leeson Creek	10	400	25	25	50	2,000				
Lewis Creek	162	200	100	400	100	-				
Lower Ahnhiculato	N.O.	75	25	40	30	7,500				
Macjack River	N.O.	N.O.	N.O.	N.O.	N.O.	-				
Mahatta Creek	260	75	N O	N.O.	N.O.	N.O.				
Marble River	1,500	1,500	75	N.O.	2,000	1,000				
McNiffe Creek	10	N.O.	25	25	50	-				
Monkey Creek	40	200	25	100	100	50				
Montgomery Ck.	75	200	N.O.	150	50	1,000				
Nequilipselis Ck.	N.O.	N.O.	N.O.	6	10	10				
Nunnimish Creek	60	N.O.	40	N.O.	-	-				
Pegatten Creek	400	3,500	1,000	5,000	5,000	6,000				
Quashtin Creek	N.O.	N.O.	N.O.	30	100	300				
Quatsino Sound Cks:										
1) Julian Creek	16	25	25	25	50	50				
2) Sawmill Ck	N.O.	N.O.	75	N.O.	N.O.	-				
3) Mahwhiciaa Ck	60	N.O.	-	-	-	-				
Ronning Creek	-	-	N.O.	N.O.	-	-				
Rupert Creek	-	-	N.O.	N.O.	50	-				
San Josef River	75	400	N.O.	N.O.	400	N.O.				
Smith Creek	-	-	N.O.	50	50	-				
Stephan's Creek	1,000	3,500	2,000	400	400	3,000				
Teeta Creek	60	N.O.	25	N.O.	50	N.O.				
Upper Ahnhiculato	40	200	50	0	-	3,000				
Utluh Creek	-	N.O.	N.O.	N.O.	-	-				
Vanohana Creek	60	400	55	N.O.	N.O.	N.O.				
Washlawlis Ck.	12	200	N.O.	N.O.	500	200				
Waukwaas Creek	450	3,500	50	750	1,000	2,000				
Youghpon Creek	N.O.	N.O.	1	50	10	N.O.				
Total	19,350	28,250	16,234	79,791	30,930	78,410				

[a,b,c]As for Appendix 2a.
[d]Escapements included with Cayeghle Creek.

Appendix 3. Age composition of WCVI chum stocks in Areas 22 to 27, 1959-1982.

The age composition data available for the WCVI chum stocks are summarized in Appendix Table 3-1. The data for the period 1959 to 1963 were extracted from Bilton et al. (1967). The data for the period 1969 to 1976 were taken from the DFO files and represent various commercial catch sampling programs and stream survey results. The data for the years 1977 to 1982 are based on the scale samples taken in the WCVI chum salmon test fisheries. Weekly breakdowns of the age data obtained in the 1977 to 1982 test fisheries are given in Appendix Tables 3-2 to 3-7.

Appendix Table 3-1. Percent chum age composition for Areas 22 - 27, 1959 - 1982.

Year	Area 22				Area 23				Area 24				Area 25				Area 26				Area 27			
	Age 3	Age 4	Age 5	No. Fish	Age 3	Age 4	Age 5	No. Fish	Age 3	Age 4	Age 5	No. Fish	Age 3	Age 4	Age 5	No. Fish	Age 3	Age 4	Age 5	No. Fish	Age 3	Age 4	Age 5	No. Fish
1959	-	-	-	-	41.4	56.4	2.2	276	-	-	-	-	59.8	39.6	0.6	394	56.9	40.9	2.1	363	-	-	-	-
1960	42.4	57.5	0.1	441	46.7	52.0	1.3	366	40.7	58.5	0.8	252	81.0	19.0	0.0	411	65.4	35.9	0.7	472	91.7	8.3	0.0	305
1961	-	-	-	-	51.9	45.9	1.8	446[a]	42.3	55.4	2.3	267	25.9	73.0	1.0	1189	14.2	84.9	0.9	905	-	-	-	-
1962	-	-	-	-	57.5	41.8	0.4	273[a]	-	-	-	-	45.0	55.4	1.2	905	50.4	48.2	1.3	759	-	-	-	-
1963	-	-	-	-	-	-	-	-	50.4	49.6	0.0	224	71.1	27.8	1.1	270	46.9	52.0	1.1	179	-	-	-	-
1964	-	-	-	-	-	-	-	-	-	-	-	-	32.7	67.3	0.0	617	-	-	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1970	-	-	-	-	16.0	84.0	0.0	-	40.0	60.0	0.0	-	58.3	41.7	0.0	-	-	-	-	-	-	-	-	-
1971	95.7	1.4	2.9	70	39.2	58.4	2.4	209	-	-	-	-	31.9	68.1	0.0	91	-	-	-	-	-	-	-	-
1972	1.6	98.4	0.0	540	30.1	67.6	2.3	216	43.7	52.3	4.0	197	34.9	58.0	7.1	612	-	-	-	-	-	-	-	-
1973	0.9	52.3	46.8	643	10.2	86.6	3.2	385	-	-	-	-	9.4	88.5	2.1	192	14.7	83.3	2.0	102	-	-	-	-
1974	39.4	12.9	47.7	155	14.9	77.0	8.1	87	-	-	-	-	14.3	67.5	18.1	154	-	-	-	-	6.6	77.8	15.6	486
1975	76.0	22.0	2.0	60	23.6[b]	59.1[b]	17.3[b]	-	19.6	58.5	22.1	240	26.1	59.5	14.4	983	-	-	-	-	-	-	-	-
1976	20.6	76.5	2.9	-	22.2	75.4	2.5	394	39.9	59.3	0.8	391	13.7	80.6	5.7	124	16.5	69.4	14.1	-	-	-	-	-
1977	8.4	89.7	1.9	107	5.4	90.1	4.5	-	13.8	84.6	1.4	282	26.6	69.9	3.5	-	9.6	84.0	6.4	-	-	-	-	-
1978	31.6	57.7	10.7	317	36.7	59.1	4.2	589	43.7	51.4	4.9	477	55.1	42.7	2.2	680	64.5	33.9	1.6	492	57.1	41.6	1.3	562
1979	45.8	49.9	4.3	507	11.1	87.2	1.7	1134	13.3	84.6	2.1	953	10.9	87.8	1.3	1,307	11.1	88.7	0.2	988	5.2	93.8	1.0	671
1980	87.1	12.9	0.0	518	40.6	42.7	16.7	1869	35.2	53.4	11.4	1,247	62.3	28.7	9.0	1426	52.0	38.1	9.9	273	78.9	21.5	1.6	550
1981	1.0	98.6	0.4	210	66.1	33.2	0.7	713	67.1	32.2	0.8	1563	79.7	19.6	0.6	911	78.2	21.3	0.4	225	63.7	35.9	0.4	804
1982	10.6	39.4	49.1	216[a]	6.7[c]	92.0[c]	1.3[c]	-	6.7[c]	92.0[c]	1.3[c]	-	6.7[c]	92.0[c]	1.3[c]	-	6.7[c]	92.0[c]	1.3[c]	-	8.9	89.5	1.6	562
					18.6	74.5	6.8	719	22.2	77.8	0.0	45	9.1	86.8	4.1	486	4.3	93.6	2.1	47	14.6[d]	80.0[d]	5.4[d]	-

[a] Some two year olds are present, generally <1%.
[b] Used mean age composition available for 1974 NCVI chum, excluding Area 22.
[c] Used mean age composition available for 1981 NCVI chum.
[d] Used mean age composition available for 1982 NCVI chum, excluding Area 22.

Appendix Table 3-2. Chum age composition (%) by week and area, WCVI chum test fishery, Areas 22-27, 1977.

Area	Age	Sept. 11-17	Sept. 18-24	Sept 25 -Oct 1	Oct. 2 - 8	Oct. 9 -15	Oct. 16-22	Oct. 23-29	Total
22	3					4.9		13.0	8.4
	4					91.8		87.0	89.7
	5					3.3		0.0	1.9
	Total					61		46	107
23	3			31.5	40.5	40.3	35.1		36.7
	4			64.6	49.4	56.4	61.9		59.1
	5			3.9	10.1	3.3	3.0		4.2
	Total			127	79	181	202		589
24	2			1.1	0.0	0.0	0.0		0.2
	3			36.5	33.8	41.3	50.5		43.6
	4			56.5	59.5	52.2	46.0		51.2
	5			5.9	5.4	6.5	3.5		4.8
	6			0.0	1.3	0.0	0.0		0.2
	Total			85	74	92	226		477
25a (Nootka)	3	68.9	50.0	52.5	52.9	42.8	58.8		55.4
	4	29.5	46.3	45.5	43.8	50.0	41.2		42.3
	5	1.6	3.7	2.0	3.3	3.6	0.0		2.1
	6	0.0	0.0	0.0	0.0	3.6	0.0		0.2
	Total	61	54	101	121	28	119		484
25b (Esperanza)	3		55.9	53.5	66.7		59.2		57.6
	4		41.2	40.9	33.3		40.8		40.0
	5		2.9	5.6	0.0		0.0		2.4
	Total		68	71	30		76		245
25 (Total)	3		53.3	52.9	55.6	42.8	59.0		55.0
	4		43.4	43.6	41.7	50.0	41.0		42.7
	5		3.3	3.5	2.7	3.6	0.0		2.2
	6		0.0	0.0	0.0	3.6	0.0		0.1
	Total		122	172	151	28	195		668
26	3			55.3	64.0	66.5		62.5	64.5
	4			39.5	34.9	31.8		37.5	33.9
	5			5.2	1.1	1.7		0.0	1.6
	Total			38	172	242		40	492
27	3			68.2	59.0	52.2	47.8		57.1
	4			31.1	38.2	47.0	51.5		41.6
	5			0.7	2.8	0.8	0.7		1.3
	Total			148	144	134	136		562
West Coast Total	2								0.03
	3								49.7
	4								47.5
	5								2.7
	6								0.07
	Total								2895

Appendix Table 3-3. Chum age composition (%) by week and area, WCVI chum test fishery, Areas 22-27, 1978.

Area	Age	Sept. 17-23	Sept. 24-30	Oct. 1-7	Oct. 8-14	Oct. 15-21	Oct. 22-28	Oct.29 -Nov.4	Total
22	3					31.1	31.3	32.3	31.6
	4					52.8	61.7	58.3	57.7
	5					16.1	7.0	9.4	10.7
	Total					106	115	96	317
23	3	4.9	8.1	17.3	7.9	15.2	8.7		11.1
	4	88.5	91.9	81.4	90.7	80.8	89.8		87.2
	5	6.6	0.0	1.3	1.4	4.0	1.5		1.7
	Total	61	185	300	214	99	275		1134
24	3	9.6	12.9	11.6	15.2	17.8			13.3
	4	87.9	84.4	85.4	83.4	81.6			84.6
	5	2.5	2.7	3.0	1.4	0.6			2.1
	Total	157	225	232	145	174			933
25a (Nootka)	3	3.6	3.5	5.2	15.6	8.3	17.8	19.8	12.4
	4	93.7	92.9	93.5	82.8	91.7	80.9	80.2	86.1
	5	2.7	3.5	1.3	1.6	0.0	1.3	0.0	1.5
	Total	112	141	77	64	72	309	162	937
25b (Esperanza)	3		0.0	5.3		7.6	11.1		5.9
	4		100.0	93.4		92.4	86.1		83.3
	5		0.0	1.3		0.0	2.8		0.8
	Total		54	152		105	36		270
25 Total	3	3.6	2.6	5.3	15.6	7.9	17.1	19.8	10.9
	4	93.7	94.8	93.4	82.8	92.1	81.4	80.2	87.8
	5	2.7	2.6	1.3	1.6	0.0	1.5	0.0	1.3
	Total	112	195	152	64	177	345	162	1207
26	3		6.0	8.2	8.9	18.8	23.7		11.1
	4		94.0	90.4	91.1	81.2	76.3		88.7
	5		0.0	1.4	0.0	0.0	0.0		0.2
	Total		100	73	124	32	59		388
27	3	2.8	6.8	6.7	3.6				5.2
	4	95.3	92.1	93.3	94.8				93.8
	5	1.9	1.1	0.0	1.6				1.0
	Total	107	176	195	193				671
West Coast Total	3								12.0
	4								85.9
	5								2.1
	Total								4650

Appendix Table 3-4. Chum age composition (%) by week and area, WCVI chum test fishery, Areas 22-27, 1979.

Area	Age	Sept. 16.22	Sept. 23-29	Sept.30 -Oct. 6	Oct. 7-13	Oct. 14-20	Oct. 21-27	Oct.28 -Nov.3	Total
22	3			40.8		34.6		64.4	45.8
	4			53.9		59.1		34.5	49.9
	5			5.3		6.2		1.1	4.3
	Total			76		257		174	507
23	3	34.1	31.2	35.7	35.7	44.1	48.9	54.4	40.6
	4	56.8	56.8	46.6	44.6	39.7	31.7	34.3	42.7
	5	9.1	12.0	17.7	19.7	16.2	19.4	11.2	16.7
	Total	44	125	440	417	494	180	169	1869
24 Gillnet	3	29.8	35.4	37.0	32.8	34.4	37.0	42.3	35.2
	4	59.6	49.6	46.5	51.7	56.3	57.4	52.1	53.4
	5	10.5	15.0	16.5	15.5	9.3	5.5	5.6	11.4
	Total	57	113	170	290	311	235	71	1247
24 Seine	3					37.8	58.1		44.4
	4					54.4	38.7		49.3
	5					7.8	3.2		6.3
	Total					193	93		286
25a	3	38.0	51.1	53.8	56.0	44.6	52.4		47.6
	4	38.0	30.0	38.7	32.0	47.3	42.8		38.0
	5	24.0	18.9	7.5	12.0	8.1	4.8		14.4
	Total	108	90	106	25	74	21		424
25b*	3	44.0	38.9	47.9	63.6	59.1	69.7		53.8
	4	24.0	27.8	39.4	27.3	35.2	27.3		32.7
	5	32.0	33.7	12.7	9.1	5.7	3.0		13.5
	Total	25	36	71	22	88	33		275
25* Overall	3	39.1	47.6	59.7	73.4	68.4	63.0		62.3
	4	35.3	29.4	33.5	21.3	26.7	33.3		28.7
	5	25.6	23.0	6.8	5.4	4.9	3.7		9.0
	Total	133	126	412	334	367	54		1426
26	3		50.7	50.8	50.7				52.0
	4		31.5	32.0	43.3				38.1
	5		17.8	10.0	6.0				9.9
	Total		73	50	150				273
27	3			68.8		74.2		86.9	76.9
	4			27.5		25.2		12.6	21.5
	5			3.7		0.6		0.5	1.6
Total	Total			189		163		198	550
West Coast Gillnet Total	3								49.1
	4								40.0
	5								10.9
	Total								5872

* Does not include Mary Basin

Appendix Table 3-5. Chum age composition (%) by week and area, WCVI chum test fishery, Areas 22-27, 1980.

Area	Age	Sept. 14-20	Sept. 21-27	Sept. 28 Oct. 4	Oct. 5-11	Oct. 12-18	Oct. 19-25	Oct. 26- Nov. 1	Total
22	3	-	-	-	81.1	97.3	90.8	88.0	87.1
(Gill-	4	-	-	-	18.9	2.7	9.2	12.0	12.9
net)	5	-	-	-	0.0	0.0	0.0	0.0	0.0
	Total fish	-	-	-	244	75	174	25	518
23	3	-	66.3	-	-	62.5	76.4	-	66.1
(Gill-	4	-	33.0	-	-	36.6	23.6	-	33.2
net)	5	-	0.7	-	-	0.9	0.0	-	0.7
	Total fish	-	267	-	-	336	110	-	713
24	3	55.3	68.0	68.3	69.9	62.2	69.2	-	67.1
(Gill-	4	42.7	30.3	31.4	29.4	37.2	30.8	-	32.2
net)	5	2.0	1.7	0.3	0.7	0.6	0.0	-	0.8
	Total fish	150	175	366	531	156	185	-	1,563
		N[a]	E[b]	E[b]					
25	3	80.8	84.6	75.0	-	-	-	-	79.7
(Gill-	4	17.8	15.4	25.0	-	-	-	-	19.6
net)	5	1.4	0.0	0.0	-	-	-	-	0.6
	Total fish	146	65	100	-	-	-	-	311
26	3	-		78.2	-	-	-	-	78.2
(Gill-	4	-		21.3	-	-	-	-	21.3
net)	5	-		0.4	-	-	-	-	0.4
	Total fish	-		225	-	-	-	-	225
27	3	(Not broken down by week)							63.7
(Gill-	4								35.9
net)	5								0.4
	Total fish								804

[a] Nootka.
[b] Esperanza.

Appendix Table 3-6. Chum age composition (%) by week for Areas 22 and 27, WCVI chum test fishery, 1981.

Area	Age	Sept. 20-26	Sept. 27-Oct. 3	Oct. 4-10	Oct. 11-17	Oct. 18-24	Oct. 25-31	Total
22	3	-	-	3.8	0	0	0	1.0
(Seine)	4	-	-	96.2	100	99.2	100	98.6
	5	-	-	0.0	0	0.8	0	0.4
	Total fish	-	-	52	13	120	25	210
27	3	6.1	11.4	12.5	8.0	8.6		8.9
	4	93.9	84.0	83.3	90.0	91.4		89.5
	5	0.0	4.6	4.2	2.0	0.0		1.6
	Total fish	147	131	48	50	186		562

Appendix Table 3-7. Chum age composition (%) by week and area, WCVI chum test fishery, Areas 22-26, 1982.

Area	Age	Sept. 19-25	Sept. 26-Oct. 2	Oct. 3-9	Oct. 10-16	Oct. 17-23	Oct. 24-30	Nov. 1-3	Total
22	2	-	-	-	0.0	0.0	0.0	9.1	0.9
(Seine)	3	-	-	-	6.0	6.8	10.0	45.5	10.6
	4	-	-	-	40.0	40.5	35.0	36.4	39.4
	5	-	-	-	54.0	52.7	55.0	9.1	49.1
	Total fish	-	-	-	100	74	20	22	216
23	3	-	-	19.2	18.1	-	-	-	18.6
(Gill-	4	-	-	73.5	75.5	-	-	-	74.5
net)	5	-	-	7.3	6.4	-	-	-	6.8
	Total fish	-	-	359	360	-	-	-	719
24	3	-	13.3	40.0	-	-	-	-	22.2
(Seine)	4	-	86.7	60.0	-	-	-	-	77.8
	5	-	0.0	0.0	-	-	-	-	0.0
	Total fish	-	30	15	-	-	-	-	45
25	3	9.1	8.9	-	-	-	-	-	9.1
(Seine)	4	86.6	88.9	-	-	-	-	-	86.8
	5	4.3	2.2	-	-	-	-	-	4.1
	Total fish	441	45	-	-	-	-	-	486
26	3	-	4.3	-	-	-	-	-	4.3
(Seine)	4	-	93.6	-	-	-	-	-	93.6
	5	-	2.1	-	-	-	-	-	2.1
	Total fish	-	47	-	-	-	-	-	47

Appendix 4. WCVI chum salmon test fisheries in Areas 22 to 27, 1977-1982.

Gillnet test fisheries in Areas 22-27, 1977-1982

The test fisheries in Areas 22 to 27 were initiated in order to provide a continuing source of reliable age data and to develop an index of abundance for chum stocks. Prior to these test fisheries, age data were collected only from commercial fisheries which did not provide a continuous data source and from Indian Food Fisheries which were erratic and limited.

Compared to the WCVI test fisheries, the test fisheries in the Johnstone Strait and Fraser River are long established. In both latter cases, the fish are passing through a restricted waterway enroute to a distant spawning area. These test fisheries occur at established locations and aim at generating an index of abundance for the passing fish. The situation in the inlets of Vancouver Island is quite different. The fish enter the inlets and mill around extensively until they enter adjacent spawning streams. Fish movements in the inlets tend to follow certain patterns but these may vary extensively with changes in tidal and weather conditions, and water levels in the streams. In order to allow for these erratic movements, the test fishing effort is not confined to a single location but is spread throughout the inlets. Areas in which the fish mass, such as at river mouths, are avoided.

The WCVI test fisheries were initiated in 1977 and generally occurred in those areas open during the commercial fisheries. The operation was similar to the normal commercial fishing. Each set was generally restricted to one hour, but this period was reduced if a large number of fish were present in the area. Set duration was measured from the time the net was placed in the water to halfway between the start and finish of the pick-up. In a few cases, only part of the net was set and the catch figures were adjusted accordingly. Test fishing results were expressed as catch per hour to provide catch per unit of effort. The test fishermen were paid by receiving a set number of fish each week from their test catch. For this reason gillnets, rather than purse seines, were used. The number of fish required to support a test fishery using seines would be prohibitive in years of low stock abundance.

The size of gillnets used in each area is given in the text. Since the DFO could not supply nets for the test fishing programs, fishermen's own nets were employed. These were normally used by the fishermen when operating in these areas and the net size may reflect personal size preference. Net sizes remained unchanged throughout the test fishing program in each area.

The weekly mean chum test catches per hour are given in the text. Detailed records for each set are available at the DFO South Coast Division Fisheries Office (3225 Stephenson Pt. Road, Nanaimo, B.C.).

Seine test fisheries in Areas 24, 25 and 26, 1982

In 1982, a commercial seine boat "Pachena No. 1" was chartered in order to determine if the stock abundance of chum salmon in Areas 24, 25 and 26 was sufficient to support a commercial fishery. Test fishing was carried out in a manner determined to be most effective by the captain of the vessel. Detailed records for each set are available at the DFO South Coast Division Fisheries Office. Appendix Table 4-1 summarizes the test catch data.

Appendix 4. (cont'd.)

Appendix Table 4-1. Results of seine test fisheries in Areas 24, 25 and 26, 1982.

Area	Seining date	No. sets	No. fish	Mean catch per set
24	Sept. 20 & 21	12	2,040	170
25	Sept. 20 - 26	31	8,183	264
	Sept. 29	3	545	182
	Total	34	8,728	257
26	Sept. 30 - Oct. 4	15	13,272	885

Fish quality was noted for each set and varied from mostly bright to mostly dark chum depending on the movement of new fish into the area. After September 25, a noticeable decline in fish quality was observed.

Based partly on the seine test catches and partly on visual observations, all three areas were opened to commercial fishing as follows:

Area 24 October 6-7
Area 25 September 26 - October 1 and October 4-8
Area 26 September 28-30 and October 7-9

Catches totalled 36,000 chum in Area 24, 200,000 in Area 25 and 311,000 in Area 26.

While the above test fishing method using seines gives a subjective estimate of fish abundance, the numbers of fish caught cannot be used to predict stock size. Since chum salmon tend to concentrate to varying degrees in different areas of the WCVI inlets, large seine catches may not necessarily indicate large returns. The experience of the skipper and of DFO staff on board are critical in assessing the results of seine test catches.

Appendix 5. Chum salmon fish quality study in Areas 21 and 22, 1981.

The chum salmon fish quality study was undertaken to compare the condition of chum salmon before and after entering Nitinat Lake. The vessels employed and net specifications were as follows:

	Vessel type	Net specifications
Area 21 (outside)	Seine	Standard seine net 220 fathoms x 5 1/4 strips
Area 22 (inside)	Gillnet	200 fathoms x 60 mesh, 15.2 cm (6") mesh, #33 twine Ratio: 2.2:1

Catch results in Area 21 (outside)

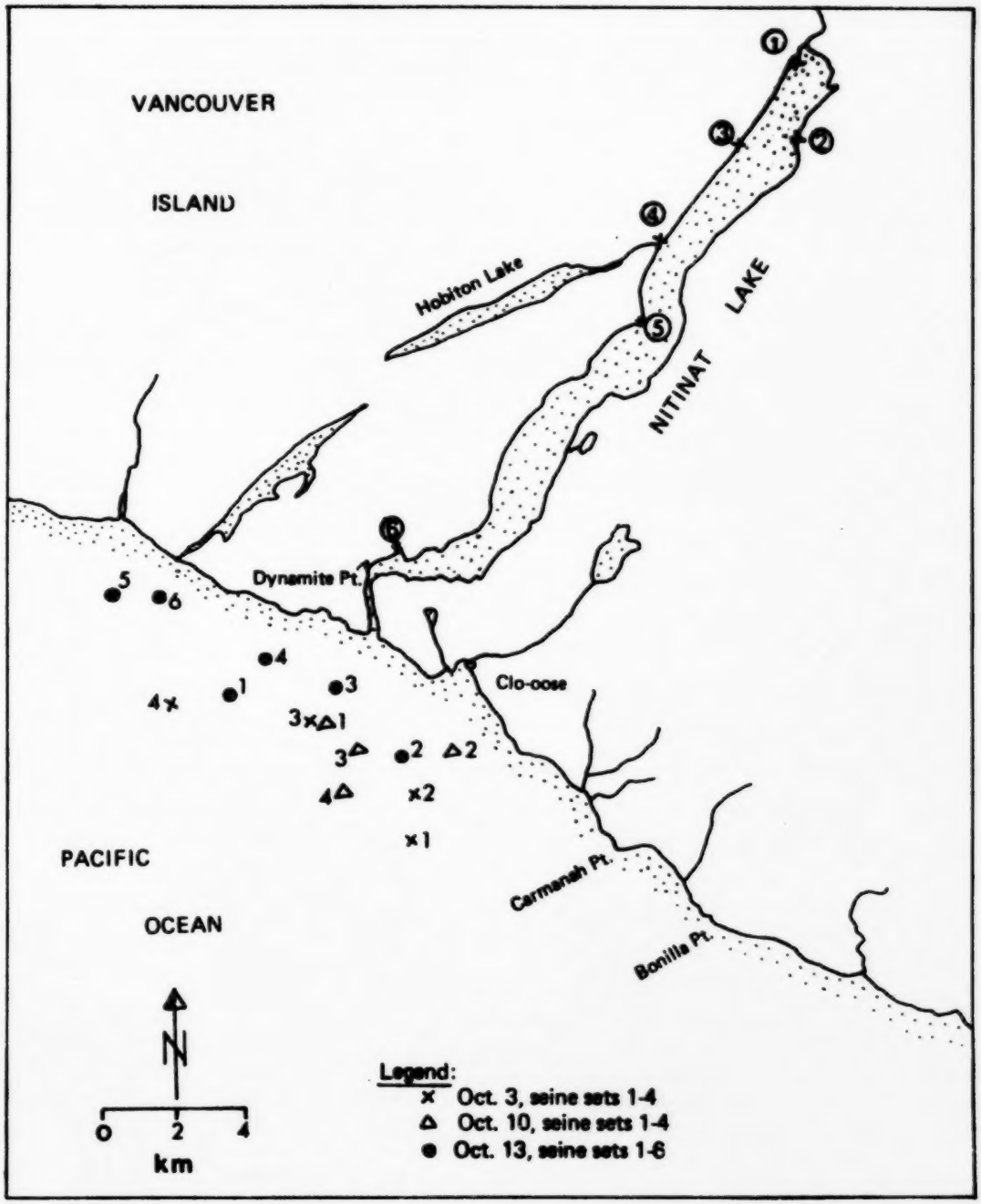
During the three test fishing days (October 3, 10 and 13), 14 seine sets were made in Area 21 at locations indicated in Appendix Figure 5-1. Catch results for individual sets are shown in Appendix Table 5-1. The incidental catches of chinook and coho were less than 0.2% of the total. The condition of chum during grading at delivery is given in Appendix Table 5-2, and the age composition of the catch is shown below:

Age	No. Fish	%
3	2	1.3
4	158	98.7

Catch results in Area 22 (inside)

During the seven test fishing days (October 5, 7, 9, 13, 14, 19 and 21), 34 gillnet sets were made in Area 22 at locations indicated in Appendix Figure 5-1. Catch results for individual sets are shown in Appendix Table 5-3. Weekly mean catches are shown in Appendix Table 5-4. Incidental catch of coho was 0.09% or half of that observed in the "outside" catch. The condition of chum as they were brought aboard was evaluated by the skipper (Appendix Table 5-5). The condition of chum during grading at delivery (Trans-Pacific Fish) is shown in Appendix Table 5-6. Chum age composition was determined from scale samples taken by the Nitinat hatchery staff on October 10, 13, 22 and 23, 1981, and was as follows:

Age	No. fish	%
3	2	0
4	207	98.6
5	1	0.4



Appendix Fig. 5-1. Location of Area 21 seine test sets and of Area 22 (Nitinat Lake) gillnet test sets.

Appendix Table 5-1. Results of seine test fishery in Area 21, 1981.

Fishing date 1981	Set No. (For location see Appendix Fig. 5-1)	Catch per set			
		Chum	Chinook	Coho	
October 3	1	8	0	1	
	2	10	0	0	
	3	99	0	1	(juvenile)
	4	10	0	0	
October 10	1	55	1	0	
	2	650	1	0	
	3	111	0	0	
	4	525	0	0	
October 13	1	900	0	0	
	2	9	0	0	
	3	162	0	1	
	4	181	0	0	
	5	45	0	0	
	6	30	0	0	
Total	14 sets	2,795	2	3	

Appendix Table 5-2. Grading at delivery of seine test catches of chum in Area 21, 1981.

Fish weight (kg)	Condition	Chum catch		
		No.	Weight (kg)	Percent
2.7 - 4.1	Semi-bright	827	2,849	-
4.1 - 5.4	Semi-bright	463	2,255	-
5.4 +	Semi-bright	98	577	-
			5,681	49.3
2.7 - 4.1	Quala (dark)	306	1,061	-
4.1 - 5.4	Quala (dark)	497	2,416	-
5.4 +	Quala (dark)	162	955	-
			4,432	38.4
-	Canners	347	1,419	12.3
	Total	-	11,532	100.0

Appendix Table 5-3. Results of gillnet test fishery in Area 22, 1981.

Fishing date 1981	Set No.	Set location (see Append. Fig. 5-1)	Duration of set (hr)	Total catch	Catch per hr
Oct. 5	1	2	1.4	101	72.1
	2	3	1.1	7	6.4
	3	5	1.2	39	32.5
	4	opp. 5	1.2	37	30.8
	5	6	1.6	135	84.4
	6	5/6	1.4	59	42.1
	7	Dynamite Pt.	1.5	164	109.3
Oct. 7	1	6	0.7	55	78.6
	2	6	0.7	81	115.7
	3	5/6	1.2	53	44.2
	4	6	1.2	24	20.6
	5	5/6	1.4	103	73.6
	6	5/6	1.4	66	47.1
Oct. 9	1	4	1.3	57	43.8
Oct. 13	1	2	1.1	4	3.6
	2	5	1.2	5	4.2
	3	opp. 5	1.1	18	16.4
	4	5	1.3	74	56.9
	5	5	1.3	76	58.5
	6	5/6	1.3	69	53.1
	7	6	0.7	24	34.3
	8	5/6	1.4	266	190.0
Oct. 14	1	3	1.4	83	59.3
	2	4	1.4	124	88.6
	3	5	1.6	98	61.3
	4	5/6	1.3	5	3.8
Oct. 19	1	2	1.4	118	84.3
	2	opp. 3	1.2	72	60.0
	3	5	1.1	15	13.6
	4	opp. 5	1.2	32	26.7
	5	5/6	1.2	18	15.0
	6	6	1.3	10	7.7
	7	Dynamite Pt.	1.2	15	12.5
Oct. 21	1	6	1.4	140	100.0

Appendix Table 5-4. Weekly mean catch per hour of chum salmon in the gillnet test fishery in Area 22, 1981.

Fishing date	No. sets	No. hrs set	Total catch		Chum catch per hour
			chum	coho	
October 5-9	14	17.3	981	2	56.7
October 13-14	12	15.1	846	0	56.0
October 19-21	8	10.0	420	0	42.0
Total	34	42.4	2,247	2	53.0

Appendix Table 5-5. Grading at the time of catch of gillnet test catches of chum in Area 22, 1981.

Fishing date	Bright		Semi-bright		Quala (dark)		Total No.	
	No.	(%)	No.	(%)	No.	(%)		
October 5-9	2	-	233	-	746	-	-	-
October 13-14	0	-	6	-	840	-	-	-
October 19-21	32	-	30	-	358	-	-	-
Total	34	(1.5)	269	(12.0)	1,944	(86.5)	2,247	(100)

Appendix Table 5-6. Grading at delivery of gillnet test catches of chum in Area 22, 1981.

Date	Semi-bright		Quala (dark)		Canners		Total
	Wt. (kg)	(%)	Wt. (kg)	(%)	Wt. (kg)	(%)	Weight (kg)
October 16	12.2	-	1,769.0	-	3,496.3	-	-
October 26	20.0	-	136.1	-	4,810.8	-	-
Total	32.2	(0.3)	1,905.1	(18.6)	8,307.1	(81.1)	10,244.4

Appendix 6. Mean spawning timing of major WCVI chum salmon stocks in Areas 22-27.[a]

Stream	Arrive in stream	Start of spawning	Peak of spawning	End of spawning
AREA 22				
Nitinat River	Oct. 5	Oct. 15	Nov. 5	Nov. 25
AREA 23				
Nahmint River	Sep. 15	Oct. 15	Nov. 10	Nov. 20
Sarita River	Oct. 4	Oct. 15	Nov. 2	Nov. 24
Toquart River	Oct. 2	Oct. 14	Oct. 30	Nov. 21
AREA 24				
Atleo River	Sep. 28	Oct. 7	Oct. 24	Nov. 16
Bawden Bay Creek	Oct. 13	Oct. 23	Nov. 2	Nov. 18
Megin River	Sep. 29	Oct. 11	Oct. 26	Nov. 14
Moyeha River	Sep. 28	Oct. 12	Oct. 24	Nov. 12
Tranquil Creek	Sep. 12	Sep. 29	Oct. 17	Nov. 9
AREA 25				
Burman River	Sep. 19	Sep. 24	Oct. 21	Nov. 21
Canton Creek	Sep. 16	Sep. 29	Oct. 27	Nov. 16
Chum Creek	Sep. 15	Sep. 24	Oct. 22	Nov. 16
Conuma River	Sep. 19	Sep. 23	Oct. 22	Nov. 17
Deserted Creek	Sep. 24	Sep. 28	Oct. 26	Nov. 19
Inner Basin Rs.	-	Sep. 28	Oct. 25	Nov. 16
Leiner River	Sep. 17	Oct. 1	Oct. 29	Nov. 22
Park River	Sep. 20	Sep. 25	Oct. 22	Nov. 16
Sucwoa River	Sep. 18	Sep. 28	Oct. 25	Nov. 19
Tahsis River	Sep. 8	Sep. 27	Oct. 25	Nov. 20
Tlupana River	Sep. 24	Sep. 29	Oct. 24	Nov. 19
Tsowwin River	Sep. 20	Sep. 28	Oct. 29	Nov. 20
Zeballos River	Sep. 11	Oct. 1	Oct. 26	Nov. 17
AREA 26				
Chamiss Creek	Sep. 23	Oct. 6	Oct. 28	Nov. 15
Clanninick Creek	Sep. 21	Oct. 6	Nov. 1	Nov. 14
Kauwinch River	Sep. 23	Sep. 27	Oct. 21	Nov. 17
Malksope River	Sep. 28	Oct. 2	Oct. 23	Nov. 18
Tahsish River	Oct. 3	Oct. 5	Oct. 26	Nov. 17
AREA 27				
Cayeghle Creek	Sep. 27	Oct. 3	Oct. 21	Nov. 13
Colonial Creek	Sep. 29	Oct. 5	Oct. 20	Nov. 11
Denad Creek	Oct. 1	Oct. 4	Oct. 21	Nov. 1
Jim's Creek	Oct. 1	Oct. 3	Oct. 20	Nov. 4
Klaskish River	Oct. 5	Oct. 8	Oct. 21	Nov. 5
Klayina Creek	Oct. 1	Oct. 7	Oct. 21	Nov. 6
Koprino River	Sep. 23	Sep. 25	Oct. 9	Nov. 3

[a] From 1970-1982 DFO spawning files.

Appendix 7a. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1970[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 31-June 27			-	-	-	-	-	-	-	-	-	-	-	-	-	112	-	112
June 28-Aug. 1			-	34	-	34	-	-	-	1	-	1	-	-	-	1,929	-	1,929
Aug. 2-8			-	-	-	-	3	-	3	-	-	-	-	-	-	99	38	137
9-15			-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	13
16-22			-	-	-	-	-	-	-	-	2	2	-	-	-	1	-	1
23-29			-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-
30-Sep. 5			-	6	-	6	-	-	-	-	-	-	-	25	25	25	-	25
Sep. 6-12			-	160	-	160	-	-	-	-	-	-	-	-	-	86	-	86
13-19			-	-	-	-	-	-	-	-	-	-	-	-	-	1,036	-	1,036
20-26			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Oct. 3			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct. 4-10			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-17			-	16,382	3,847	20,229	-	-	-	12,569	89,187	101,756	-	-	-	-	-	-
18-24			-	-	-	-	-	-	-	-	1,551	1,551	-	-	-	-	-	-
25-31			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total			0	16,582	3,847	20,429	3	-	3	12,570	90,741	103,311	-	25	25	3,301	38	3,339

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7b. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1971[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 30-June 26			-	-	-	-	-	-	-	-	-	-	-	-	-	100	3	103
June 27-July 31			-	1	-	1	-	-	-	-	-	-	-	-	-	271	-	271
Aug. 1-7			-	2	-	2	-	-	-	-	-	-	-	-	-	299	-	299
8-14			-	-	-	-	-	-	-	-	-	-	-	-	-	575	-	575
15-21			-	-	-	-	-	-	-	-	-	-	-	-	-	363	-	363
22-28			-	1	-	1	-	-	-	-	-	-	-	-	-	193	-	193
29-Sep. 4			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep. 5-11			-	4	-	4	-	-	-	313	-	313	-	-	-	-	-	-
12-18			-	62	-	62	-	395	395	599	-	599	-	-	-	-	-	-
19-25			-	803	-	803	-	976	976	1,744	3,957	5,701	-	-	-	-	-	-
26-Oct. 2			-	3,887	2,309	6,196	-	574	574	5,597	13,113	18,710	956	1,431	2,387	-	-	-
Oct. 3-9			-	10,814	7,159	17,973	-	1,091	1,091	13,788	25,744	39,532	3,281	1,948	5,229	-	-	-
10-16			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-23			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-30			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total			0	15,574	9,468	25,042	0	3,036	3,036	22,041	42,814	64,855	4,237	3,379	7,616	1,801	3	1,804

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7c. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1972[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 28-June 24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	33
June 25-July 29	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	326	-	326
July 30-Aug. 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	11
Aug. 6-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3
13-19	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	104	-	104
20-26	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	58	-	58
27-Sep. 2	-	-	-	12	-	12	-	-	-	-	-	-	-	-	-	54	-	54
Sep. 3-9	-	-	-	139	17	156	-	-	-	145	138	283	-	-	-	319	-	319
10-16	-	-	-	1,484	24	1,508	-	-	-	3,297	2,314	5,611	-	-	-	3,654	-	3,654
17-23	-	-	-	4,037	283	4,320	124	3,644	3,768	7,469	3,855	11,324	860	-	860	-	-	-
24-30	-	-	-	7,016	744	7,760	465	9,830	10,295	17,510	16,987	34,497	3,746	3,123	6,869	-	-	-
Oct. 1-7	-	-	-	21,017	5,302	26,319	164	19,494	19,658	20,153	31,773	51,926	3,645	-	3,645	-	-	-
8-14	-	-	-	288	-	288	-	-	-	-	-	-	-	-	-	-	-	-
15-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-28	218,178	962,565	1,180,743	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29-Nov. 4	29,004	81,515	110,519	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	247,182	1,044,080	1,291,262	33,996	6,370	40,366	753	32,971	33,724	48,574	55,067	103,641	8,251	3,123	11,374	4,562	0	4,562

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7d. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1973[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 27-June 25	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	105	-	105
June 26-July 28	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	3,209	-	3,209
July 29-Aug. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	-	622
Aug. 5-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	130	-	130
12-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28	-	28
19-25	-	-	-	6	-	6	-	-	-	2	8	10	1	-	1	18	-	18
26-Sep. 1	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	442	-	442
Sep. 2-8	-	-	-	127	-	127	-	-	-	198	-	198	-	-	-	1,379	-	1,379
9-15	-	-	-	974	-	974	-	22	22	2,916	3,927	6,843	-	-	-	3,807	2,115	5,922
16-22	-	-	-	5,539	450	5,989	-	-	-	4,351	15,542	19,893	109	-	109	-	-	-
23-29	-	-	-	20,456	1,803	22,259	-	-	-	14,405	16,259	30,664	-	-	-	-	-	-
30-Oct. 6	-	-	-	34,200	32,142	66,342	107	-	107	30,179	58,932	89,111	14,018	10,482	24,500	-	-	-
Oct. 7-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-20	200	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-27	49,787	124,847	174,634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	49,987	124,847	174,834	61,305	34,395	95,700	107	22	129	52,051	94,668	146,719	14,129	10,482	24,609	9,740	2,115	11,855

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7e. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1974[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 2-29			-	9	1	10	-	-	-	-	-	-	-	-	-	170	-	170
June 30-July 27			-	5	2	7	-	28	28	-	-	-	-	-	-	2,800	-	2,800
July 28-Aug. 3			-	95	-	95	-	-	-	-	-	-	-	-	-	111	-	111
Aug. 4-10			-	-	-	-	-	-	-	-	-	-	1	-	1	153	-	153
11-17			-	-	-	-	-	-	-	-	159	159	-	-	-	285	-	285
18-24			-	-	-	-	-	-	-	-	-	-	16	-	16	213	-	213
25-31			-	-	-	-	-	-	-	-	-	-	-	-	-	306	-	306
Sep. 1-7			-	4	1	5	-	-	-	417	128	545	7,263	2,338	9,601	997	10	1,007
8-14			-	-	-	-	-	-	-	2,372	1,380	3,752	245	-	245	-	-	-
15-21			-	-	-	-	-	-	-	6,105	7,879	13,984	3,879	2,465	6,344	-	-	-
22-28			-	-	-	-	-	-	-	-	69	69	-	-	-	-	-	-
29-Oct. 5			-	-	2,336	2,336	-	-	-	51,787	92,603	144,390	15,216	29,864	45,080	-	-	-
Oct. 6-12			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-19			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-26			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Nov. 2			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total			0	113	2,340	2,453	0	28	28	60,681	102,218	162,899	26,620	34,667	61,287	5,035	10	5,045

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7f. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1975[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 1-28			-	38	-	38			-	-	-	-	-	-	-	1,544	-	1,544
June 29-July 26			-	176	-	176			-	-	-	-	15	-	15	15,122	106	15,228
July 27-Aug. 2			-	-	-	-			-	-	-	-	-	-	-	-	-	-
Aug. 3-9			-	-	-	-			-	-	-	-	-	-	-	-	-	-
10-16			-	1	-	1			-	-	-	-	-	-	-	-	-	-
17-23			-	-	-	-			-	-	-	-	-	-	-	8	-	8
24-30			-	1	-	1			-	-	-	-	-	-	-	328	-	328
31-Sep. 6			-	4	50	54			-	-	-	-	-	-	-	90	-	90
Sep. 7-13			-	76	9	85			-	143	214	357	-	283	283	2,683	-	2,683
14-20			-	1,253	-	1,253			-	3,616	806	4,422	2,256	-	2,256	2,524	6	2,530
21-27			-	-	-	-			-	-	-	-	-	-	-	-	-	-
28-Oct. 4			-	-	-	-			-	29,516	29,072	58,588	9,380	26,049	35,429	2,006	1,764	3,770
Oct. 5-11			-	-	-	-			-	-	-	-	-	-	-	-	-	-
12-18			-	-	-	-			-	-	-	-	-	-	-	-	-	-
19-25			-	-	-	-			-	-	-	-	-	-	-	-	-	-
26-Nov. 1			-	-	-	-			-	-	-	-	-	-	-	-	-	-
Total			0	1,549	59	1,608			0	33,275	30,092	63,367	11,651	26,332	37,983	24,305	1,876	26,181

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7g. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1976[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 30-June 26			-	107	-	107	-	-	-	-	-	-	-	-	-	447	-	447
June 27-July 31			-	538	68	713	4	-	4	-	27	27	-	-	-	9,464	4,468	13,932
Aug. 1-7			-	52	1	53	-	-	-	-	-	-	1	-	1	1,084	-	1,084
8-14			-	9	-	9	-	-	-	-	-	-	-	2	2	1,105	-	1,105
15-21			-	1	-	1	-	-	-	-	1	1	1	2	3	302	-	302
22-28			-	-	-	-	-	9	9	-	-	-	-	3	3	122	-	122
29-Sep. 4			-	36	-	36	-	-	-	-	-	-	6	-	6	34	-	34
Sep. 5-11			-	492	-	492	-	-	-	-	-	-	-	-	-	56	-	56
12-18			-	1,274	-	1,274	-	-	-	126	65	191	-	28	28	173	-	173
19-25			-	-	111	111	-	-	-	-	-	-	-	-	-	-	-	-
26-Oct. 2			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct. 3-9			-	-	-	-	-	-	-	11,892	6,541	18,433	1,395	7,150	8,545	-	-	-
10-16			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-23			-	-	-	-	6,577	61,573	68,150	-	-	-	-	-	-	-	-	-
24-30			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total			0	2,509	180	2,689	6,581	61,582	68,163	12,018	6,634	18,652	1,403	7,185	8,588	12,787	4,468	17,255

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7h. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1977[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 29-June 25			-	45	99	144	-	-	-	-	-	-	3	24	27	410	392	802
June 26-July 30			-	14	278	292	-	-	-	-	-	-	25	-	25	3,522	3,919	7,441
July 31-Aug. 6			-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-
Aug. 7-13			-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-
14-20			-	-	-	-	347	-	347	-	-	-	-	-	-	-	-	-
21-27			-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
28-Sep. 3			-	-	-	-	-	-	-	-	70	70	-	-	-	-	-	-
Sep. 4-10			-	-	-	-	-	-	-	-	765	765	-	-	-	-	-	-
11-17			-	-	-	-	-	1,468	1,468	473	898	1,371	-	-	-	-	-	-
18-24			-	13	15	28	-	-	-	-	-	-	-	-	-	-	-	-
25-Oct. 1			-	-	-	-	-	-	-	-	-	-	-	-	-	149	-	149
Oct. 2-8			-	-	-	-	-	-	-	-	-	-	-	-	-	148	-	148
9-15			-	-	-	-	-	-	-	-	-	-	-	-	-	147	-	147
16-22			-	-	-	-	-	-	-	-	-	-	-	-	-	150	-	150
23-29			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total			0	73	394	467	348	1,468	1,816	473	1,733	2,206	28	24	52	4,526	4,311	8,837

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 71. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1978[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 4-July 1			-	21	102	123	-	-	-	-	-	-	-	-	-	-	-	-
July 2-29			-	2	4	6	42	107	149	-	-	-	145	-	145	9	-	9
30-Aug. 5			-	-	-	-	-	-	-	-	-	-	93	-	93	-	-	-
Aug. 6-12			-	-	-	-	-	-	-	-	-	-	-	-	-	178	-	178
13-19			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-26			-	-	-	-	-	6	6	-	-	-	-	-	-	-	-	-
27-Sep. 2			-	50	-	50	-	-	-	-	36	36	-	-	-	-	-	-
Sep. 3-9			-	3	1	4	633	980	1,613	361	3,215	3,576	-	-	-	-	-	-
10-16			-	23	-	23	-	-	-	-	-	-	-	-	-	-	-	-
17-23			-	4	-	4	-	-	-	160	-	160	-	-	-	110	-	110
24-30			-	392	-	392	-	-	-	258	-	258	-	-	-	176	-	176
Oct. 1-7			-	29	-	29	504	-	504	184	-	184	192	-	192	-	-	-
8-14			-	643	-	643	-	-	-	-	-	-	221	-	221	-	-	-
15-21			-	14,092	25,608	39,700	2,117	22,695	24,812	214	-	214	-	-	-	-	-	-
22-28			-	858	27,366	28,224	10,831	86,910	97,741	-	634	634	370	-	370	-	-	-
29-Nov. 4			-	272	452	724	-	-	-	200	-	200	-	-	-	-	-	-
Total			0	16,389	53,533	69,922	14,127	110,698	124,825	1,377	3,855	5,262	1,021	-	1,021	473	-	473

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7J. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1979[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 3-30			-	40	62	102	-	-	-			-			-	-	-	-
July 1-28			-	133	2	135	-	-	-			-			-	-	-	-
29-Aug. 4			-	-	39	39	-	-	-			-			-	-	-	-
Aug. 5-11			-	1	99	100	-	-	-			-			-	95	264	359
12-18			-	-	-	-	-	-	-			-			-	-	-	-
19-25			-	-	-	-	-	-	-			-			-	-	-	-
26-Sep. 1			-	2	-	2	-	-	-			-			-	-	-	-
Sep. 2-8			-	-	-	-	-	-	-			-			-	-	-	-
9-15			-	-	-	-	-	-	-			-			-	-	-	-
16-22			-	-	-	-	-	-	-			-			-	-	-	-
23-29			-	166	-	166	-	-	-			-			-	-	-	-
30-Oct. 6			-	460	-	460	-	-	-			-			-	-	-	-
Oct. 7-13			-	431	-	431	-	-	-			-			-	-	-	-
14-20			-	499	-	499	-	399	399			-			-	-	-	-
21-27			-	-	-	-	-	801	801			-			-	-	-	-
28-Nov. 3			-	148	-	148	-	-	-			-			-	-	-	-
Total			0	1,880	202	2,082	-	1,200	1,200			0			0	95	264	359

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7k. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1980[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 1-28	-	-	-	133	10	143	-	-	-	-	-	-	-	-	-	-	-	-
29-July 26	-	-	-	1,455	26	1,481	-	-	-	-	-	-	-	-	-	-	-	-
July 27-Aug. 2	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Aug. 3-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-16	-	-	-	-	-	-	74	-	74	-	-	-	-	-	-	8	-	8
17-23	-	-	-	129	-	129	-	-	-	-	-	-	-	-	-	-	-	-
24-30	-	-	-	11	-	11	-	-	-	-	-	-	-	-	-	-	-	-
31-Sep. 6	-	-	-	55	8	63	-	-	-	-	-	-	-	-	-	-	-	-
Sep. 7-13	-	-	-	155	10	165	-	-	-	-	-	-	-	-	-	-	-	-
14-20	-	-	-	-	-	-	-	-	-	182	-	182	-	-	-	-	-	-
21-27	-	-	-	-	-	-	-	-	-	412	-	412	-	-	-	-	-	-
28-Oct. 4	-	-	-	30,932	-	30,932	348	-	348	509	-	509	-	-	-	-	-	-
Oct. 5-11	30	-	30	-	-	-	1,104	-	1,104	33,168	46,194	79,362	11,179	96,539	107,718	-	-	-
12-18	37,298	236,424	273,722	-	-	-	7,376	26,452	33,828	32,556	93,873	126,429	12,656	40,300	52,956	-	-	-
19-25	134	-	134	4,595	49,797	54,392	-	-	-	64	-	64	-	-	-	-	-	-
26-Nov. 1	18	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov. 2-29	-	-	-	-	-	-	183	-	183	-	-	-	-	-	-	-	-	-
Total	37,480	236,424	273,904	37,465	49,852	87,317	9,085	26,452	35,537	66,891	140,067	206,958	23,835	136,839	160,674	8	-	8

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 71. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1981[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
June 1-28			-	17	-	17	-	-	-	-	-	-	-	-	-	-	-	-
29-July 26			-	161	20	181	-	-	-	-	-	-	-	-	-	-	-	-
July 27-Aug. 2			-	225	5	230	-	-	-	-	-	-	-	-	-	-	-	-
Aug. 3-9			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-16			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-23			-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
24-30			-	5	-	5	-	-	-	-	-	-	-	-	-	-	-	-
31-Sep. 6			-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Sep. 7-13			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-20			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-27			-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
28-Oct. 4			-	15,973	1,598	17,571	3,746	15,362	19,108	17,236	18,322	35,558	13,940	30,024	43,964	62	-	62
Oct. 5-11			-	-	64	64	-	3,200	3,200	753	4,944	5,697	-	6,557	6,557	-	3,658	3,658
12-18			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-25			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Nov. 1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov. 2-29			-	-	-	-	42	-	42	-	-	-	-	-	-	-	-	-
Total			0	16,385	1,687	18,072	3,788	18,562	22,350	17,989	23,266	41,255	13,940	36,581	50,521	63	3,658	3,721

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 7m. Weekly gillnet (GN) and seine (SN) catches of chum salmon in Statistical Areas 22-27, 1982[a].

Period	Statistical Area																	
	22			23			24			25			26			27		
	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total	GN	SN	Total
May 30-June 25			-	157	58	215	-	-	-	-	-	-	-	-	-			-
June 27-July 31			-	79	543	622	-	-	-	-	-	-	-	-	-			-
Aug. 1-7			-	-	-	-	-	-	-	-	-	-	-	-	-			-
8-14			-	-	-	-	-	-	-	-	-	-	-	-	-			-
15-21			-	8	-	8	-	-	-	-	-	-	-	-	-			-
22-28			-	76	-	76	-	-	-	-	-	-	-	-	-			-
29-Sep. 4			-	491	-	491	-	-	-	-	1,002	1,002	-	-	-			-
Sep. 5-11			-	-	-	-	-	-	-	-	-	-	-	-	-			-
12-18			-	-	-	-	-	-	-	-	-	-	-	-	-			-
19-25			-	-	-	-	-	-	-	-	9,250	9,250	-	-	-			-
26-Oct. 2			-	28	-	28	-	367	367	54,436	14,287	68,723	17,574	120,305	137,879			-
Oct. 3-9			-	-	-	-	8,755	28,786	37,541	49,454	130,787	180,241	5,024	81,097	86,121			-
10-16			-	-	-	-	-	-	-	-	-	-	-	-	-			-
17-23			-	-	-	-	-	-	-	-	-	-	-	-	-			-
24-30			-	-	-	-	-	-	-	-	-	-	-	-	-			-
Total			0	839	601	1,440	8,755	29,153	37,908	103,890	155,326	259,216	22,598	201,402	224,000			0

[a] From B.C. Catch Statistics; includes incidental catches.

Appendix 8. Summary of net fishing effort and catch directed at chum salmon in Statistical Areas 22-26, 1970-1982[a].

Year	Statistical Area	Fishing dates	Days fishing	Number of[b]		Catch	
				Gillnets	Seines	Gillnets	Seines
1970	22	NIL					
	23	Oct. 11-13	2	130	37	16,382	3,847
	24	NIL					
	25	Oct. 14-16	2	54	80	12,569	89,187
	26	NIL					
1971	22	NIL					
	23	Sep. 26-28	2	52	6	3,887	2,309
		Oct. 3-5	2	113	24	10,814	7,159
	24	Sep. 12-14	2	0	2	0	395
		Sep. 19-21	2	0	9	0	976
		Sep. 26-28	2	0	10	0	574
		Oct. 3-9[c]	2	0	13	0	1,091
	25	Sep. 19-21	2	15	21	1,744	3,957
		Sep. 26-28	2	41	49	5,597	13,113
		Oct. 3-5	2	65	63	13,788	25,744
	26	Sep. 20-22	2	-	-	-	-
		Sep. 26-28	2	6	3	956	1,431
		Oct. 3-5	2	21	5	3,281	1,948
1972	22	Oct. 22-26	4	120	110	218,178	962,565
		Oct. 29-Nov. 2	4	35	30	29,004	81,515
	23	Sep. 10-12	2	141	4	1,484	24
		Sep. 17-19	2	70	7	4,037	283
		Sep. 24-26	2	79	10	7,016	744
		Oct. 1-3	2	137	7	21,017	5,302
	24	Sep. 17-19	2	3	31	124	3,644
		Sep. 24-26	2	5	29	465	9,830
		Oct. 1-3	2	2	38	164	19,494

Appendix 8. (cont'd)

Year	Statistical Area	Fishing dates	Days fishing	Number of[b]		Catch	
				Gillnets	Seines	Gillnets	Seines
1972 (con't)							
	25	Sep. 13-15	2	73	24	3,297	2,314
		Sep. 20-22	2	63	18	7,469	3,855
		Sep. 27-29	2	104	31	17,510	16,987
		Oct. 4-6	2	105	36	20,153	31,773
	26	Sep. 18-20	2	16	0		
		Sep. 24-26	2	16	10	3,746	3,123
		Oct. 1-3	2	14	0	3,645	0
1973	22	Oct. 21-23	2	148	101	49,787	124,847
	23	Sep. 16-18	2	N/A[d]	N/A	5,539	450
		Sep. 23-25	2	95	8	20,456	1,803
		Oct. 1-4	3	110	15	34,200	32,142
	24	NIL					
	25	Sep. 10-14	4	10	N/A	2,916	3,927
		Sep. 17-19	2	37	20	4,351	15,542
		Sep. 24-26	2	60	35	14,405	16,259
		Oct. 1-3	2	N/A	N/A	30,179	58,932
	26	Sep. 17-19	2	7	2	109	0
		Sep. 24-26	2	16	0	0	0
		Oct. 1-3	2	23	3	14,018	10,482
1974	22	NIL					
	23	NIL					
	24	NIL					
	25	Sep. 9-10	2	45	41	2,372	1,380
		Sep. 15-17	2	N/A	N/A	6,105	7,879
		Sep. 30-Oct. 2	2	N/A	N/A	51,787	92,603
	26	Sep. 2-4	2	8	N/A	7,263	2,338
		Sep. 16-18	2	76	23	3,879	2,465
		Sep. 30-Oct. 2	2	61	16	15,216	29,864

Appendix 8. (cont'd)

Year	Statistical Area	Fishing dates	Days fishing	Number of[b]		Catch	
				Gillnets	Seines	Gillnets	Seines
1975	22	NIL					
	23	NIL					
	24	NIL					
	25	Sep. 15-17	2	44	11	3,616	806
		Sep. 29-Oct. 1	2	154	70	29,516	29,072
	26	Sep. 18-20	2	21	4	3,616	806
		Sep. 29-Oct. 1	2	79	46	29,516	29,072
1976	22	NIL					
	23	NIL					
	24	Oct. 18-20	2	105	70	6,577	61,573
	25	Oct. 4-5	1	66	30	11,892	6,541
	26	Sep. 13-15	2	0	3	0	28
		Oct. 3-4	1	11	10	1,395	7,150
1977	22	NIL					
	23	NIL					
	24	NIL					
	25	NIL					
	26	NIL					
1978	22	NIL					
	23	Oct. 19-21	2	60	42	14,950	52,974
	24	Oct. 21-22	1.2	40	64	12,948	109,605
	25	Sep. 3-4	1	4	6	361	3,215
	26	NIL					
1979	22	NIL					
	23	NIL					
	24	NIL					
	25	NIL					
	26	NIL					

Appendix 8. (cont'd)

Year	Statistical Area	Fishing dates	Days fishing	Number of[b]		Catch	
				Gillnets	Seines	Gillnets	Seines
1980	22	Oct. 14-15	1	176	164	37,298	236,424
	23	Oct. 2	0.5	150	0	30,932	0
		Oct. 20-22	2	124	185	4,595	49,797
	24	Oct. 14-16	2	95	60	7,376	26,452
	25	Oct. 7-9	2	(60	54)[e]	33,168	46,194
		Oct. 14-16	2			32,556	93,873
	26	Oct. 7-9	2	(70	40)[e]	11,179	96,539
		Oct. 13-14	2			12,656	40,300
1981	22	NIL					
	23	Sep. 28 - Oct. 2	4	184	33	15,973	1,598
	24	Oct. 1-2	1	37	48	3,746	18,562
	25	Oct. 1-2	1	90	37	17,989	23,266
	26	Oct. 1-2	1	40	80	13,940	36,581
1982	22	NIL					
	23	NIL					
	24	Oct. 6-7	1	25	23	8,755	34,000
	25	Sep. 26 - Oct. 8	11	73	0	103,890	0
		Sep. 27 - Oct. 8[c]	5	0	40	0	154,324
		Oct. 7-8	1	89	40	49,454	130,787
	26	Sep. 28-30	2	66	70	17,574	120,305
		Oct. 7-9	2	10	43	5,024	81,097

[a] Fishing effort data from DFO Area Histories; catch data from B.C. Catch Statistics; Area 27 excluded since no directed chum fisheries on local stocks held there.

[b] Maximum gear number on any one fishing day.

[c] Period during which openings occurred.

[d] Not available.

[e] Total vessels operating during the chum opening.

Appendix 9. Percent of total return (catch and escapement) at ages 3, 4 and 5 for WCVI chum salmon in Areas 22 to 27, 1967-1977 broods.

Brood year	Age 3 %	Age 4 %	Age 5 %	Total return No.
		AREA 22		
1968	3.0	87.7	9.3	1,744,900
1969	9.9	71.6	18.5	252,500
1970	19.5	79.3	1.2	16,000
1971	93.3	5.3	1.4	41,400
1972	32.1	64.3	3.5	23,400
1973	9.2	88.8	2.0	44,200
1974	42.1	55.6	2.2	8,700
1975	54.2	45.8	0	4,900
1976	4.6	94.4	1.0	44,900
1977	69.7	27.6	2.7	410,500
		AREA 23		
1967	43.2	51.6	5.2	150,600
1968	13.0	79.6	7.4	266,600
1969	10.5	78.8	10.7	237,600
1970	28.7	68.9	2.3	126,000
1971	26.3	66.9	6.8	131,800
1972	12.4	85.1	2.5	210,100
1973	11.9	84.0	4.1	90,400
1974	19.1	77.5	3.4	247,500
1975	51.3	45.7	3.0	47,600
1976	23.2	75.6	1.2	89,200
1977	60.7	35.6	3.7	221,200
		AREA 24		
1971	39.0	56.7	4.3	39,400
1972	12.4	84.7	2.8	121,100
1973	29.0	62.4	8.6	57,700
1974	13.1	85.4	1.5	233,000
1975	63.9	33.6	2.5	48,900
1976	17.6	80.5	1.8	61,400
1977	56.5	43.5	0	182,500

Appendix 9. (cont'd).

Brood year	Age 3 %	Age 4 %	Age 5 %	Total return No.
		AREA 25		
1967	47.5	49.2	3.3	158,000
1968	14.5	67.2	18.3	323,200
1969	8.2	78.3	13.5	281,400
1970	22.2	74.3	3.5	210,600
1971	39.2	59.7	1.1	174,900
1972	30.9	66.9	2.2	57,400
1973	36.0	60.2	3.9	40,700
1974	22.3	75.1	2.6	141,700
1975	49.1	43.5	7.4	26,900
1976	27.4	70.4	2.2	92,700
1977	61.9	34.0	4.1	428,500
		AREA 26		
1972	38.0	61.1	0.9	31,000
1973	27.2	70.6	2.1	8,000
1974	12.2	86.2	1.6	88,000
1975	59.2	34.9	5.9	16,000
1976	13.0	84.8	2.2	58,900
1977	64.9	32.7	2.3	282,500
		AREA 27		
1974	27.9	71.5	0.6	39,800
1975	29.3	64.8	5.9	5,400
1976	30.0	68.8	1.2	41,600
1977	61.4	33.5	5.1	82,600

Appendix 10. Chum fecundity study from test fishery samples in Areas 22 to 27, 1977.

In 1977, 307 female chum caught in the WCVI test fishery were sampled for egg content in order to provide basic fecundity data. Sampled chum were selected randomly from the fish caught at scattered locations throughout the test fishing areas. Each female chum was sampled for scales (one scale removed from each side), measured for postorbital-hypural length, and had the ovaries extracted. The bags containing ovaries were placed in a 5% formaldehyde solution. Fish scales were aged at the DFO scale laboratory in Vancouver and the eggs counted at the DFO herring laboratory. The eggs were first flushed for approximately half an hour in fresh water, then counted by hand.

Results of the fecundity study are summarized in Appendix Table 10-1 and are detailed in Appendix Tables 10-2 to 10-4. Mean fecundity of the WCVI chum sampled in 1977 ranged from 2,450 eggs for Area 25 to 2,645 eggs for Area 27. The 3- and 4-year old females from each area generally showed similar mean egg counts despite the consistently greater length of the older females. Compared to the above WCVI chum fecundities, higher fecundities were observed for the Fraser River chum which averaged 3,255 eggs over a two-year period (n=168; Palmer 1972), and comparable fecundities were observed for the Hooknose Creek chum, central B.C., which averaged 2,468 eggs over a 10-year period (Hunter 1959). The correlation coefficient between fecundity and length was significant ($p < 0.05$) for all areas except Areas 22 and 26 where sample size was limited (Appendix Table 10-5). The above fecundity results for the WCVI chum stocks are incomplete due to the poor representation of the 5-year old females in the samples.

Appendix Table 10-1. Mean fecundity and length (postorbital-hypural) of female chum salmon by age, Areas 22-27, 1977 (sample size is given in parenthesis).

Area	Mean Fecundity ± 1SE				Mean Length (mm) ± 1SE			
	Age 3	Age 4	Age 5	All ages[a]	Age 3	Age 4	Age 5	All ages[a]
22	(3) 2509 ± 141	(20) 2631 ± 72	-	(23) 2615 ± 65	556.7 ± 9.3	588.3 ± 5.4	-	584.1 ± 5.3
23	(18) 2579 ± 101	(45) 2543 ± 65	(5) 2823 ± 75	(70) 2563 ± 51	580.1 ± 6.6	608.2 ± 3.3	637.2 ± 9.9	601.8 ± 3.4
24	(25) 2623 ± 77	(43) 2642 ± 62	(3) 2609 ± 395	(79) 2599 ± 47	580.6 ± 4.7	608.7 ± 3.1	602.7 ± 11.3	597.0 ± 2.9
25	(18) 2416 ± 79	(17) 2478 ± 97	-	(40) 2450 ± 54	548.1 ± 5.9	562.6 ± 6.3	-	555.0 ± 4.0
26	(7) 2482 ± 130	(8) 2243 ± 111	-	(16) 2511 ± 78	541.4 ± 7.7	578.8 ± 9.7	-	561.9 ± 7.4
27	(47) 2584 ± 48	(31) 2730 ± 86	-	(85) 2645 ± 46	532.2 ± 2.3	552.3 ± 5.7	-	535.6 ± 3.0

[a] Includes fish of unknown age.

Appendix Table10-2. Chum postorbital-hypural length and fecundity by age, Areas 22 and 23, 1977.

AREA 22

Date	Age	Length	Fecundity	
Oct. 27	4	575	2675	1
	4	575	2705	2
	4	610	3574	3
	4	580	2733	4
	4	580	2074	5
	3	575	2746	6
	4	580	2739	7
	4	575	2437	8
	4	540	2305	9
	3	545	2258	10
	4	655	2513	11
	4	620	2802	12
	4	600	2618	13
	4	585	3038	14
	4	595	2563	15
	3	550	2526	16
	4	575	2667	17
	4	590	2351	18
	4	550	2306	19
	4	600	2250	20
	4	600	2705	21
	4	595	2818	22
	4	585	2750	23=n

AREA 23

Date	Age	Length	Fecundity		Date	Age	Length	Fecundity	
Sept. 26	4	600	1	2596	Oct. 9	3	544	36	1920
	4	602	2	3074		4	623	37	2853
	Unk	546	3	2267		3	601	38	2516
	4	606	4	3483		4	633	39	2549
	4	602	5	2124		4	624	40	2719
	4	581	6	2227		4	634	41	2439
	3	543	7	2125		4	642	42	3401
Sept. 26	4	589	8	2223		4	594	43	3082
	3	577	9	2690		4	631	44	3307
	4	597	10	2383		3	586	45	2015
	3	555	11	2235		4	660	46	3315
	4	600	12	2005		4	619	47	2638
	4	605	13	2954	Oct. 10	3	623	48	3584
	4	609	14	2141		4	619	49	2483
	4	571	15	2214	Oct. 15	4	625	50	2908
	4	614	16	2697		3	551	51	2705
Oct. 1	4	584	17	1963	Oct. 16	4	612	52	2292
	3	562	18	3175		4	654	53	2601
	3	566	19	2651		4	604	54	2548
Oct. 2	4	582	20	2146		4	648	55	3136
	5	626	21	2848		4	620	56	2806
	3	588	22	2858		4	617	57	2417
	4	577	23	2100		3	590	58	2269
	4	602	24	2380		Unk	581	59	2145
	4	594	25	1809		4	611	60	2726
	4	604	26	2789		4	577	61	2377
	3	562	27	2523		4	641	62	2430
	4	602	28	2260	Oct. 17	4	582	63	1360
Oct. 3	3	606	29	3025		3	606	64	2480
Oct. 8	5	621	30	2903		4	621	65	2501
	5	623	31	2526		4	598	66	2661
	4	561	32	2332		3	561	67	2252
	5	642	33	2910		4	598	68	2220
	3	619	34	2451		3	622	69	2942
Oct. 9	5	624	35	2927		4	599	70	2883

Appendix Table10-3. Chum postorbital-hypural length and fecundity by age, Areas 24, 25 and 26, 1977.

AREA 24

Date	Age	Length	Fecundity	Date	Age	Length	Fecundity
Sept. 27	4	591	3050	Oct. 11	3	582	2600
	3	542	2528		4	595	2411
	4	612	2500		4	591	2579
	4	622	2326		4	631	2364
	3	612	2728		4	611	1819
	3	568	2867		4	602	2596
Sept. 28	Unk	637	2602	Oct. 12	Unk	535	2205
	5	583	2704		5	603	3240
	4	631	2790		3	592	3201
	4	573	2376		4	591	2558
	Unk	597	2361		5	622	1883
	3	585	2698		3	635	3169
	3	554	2816	Oct. 20	3	581	2955
	4	580	3106		3	612	3225
	Unk	565	2877		Unk	581	2621
Oct. 4	4	592	2559		Unk	571	1514
	3	556	2340		3	580	2017
	4	615	2718		4	612	3078
	4	584	2048		4	595	2749
	4	612	3216		3	622	2802
	4	577	2817		3	595	2720
	4	615	2355		4	595	2691
	4	614	2910		3	595	2227
	4	642	2560		3	562	2663
Oct. 5	3	583	2842		4	650	2745
	4	601	2662		3	570	2184
	3	604	2786		3	564	2668
	4	620	1429		3	555	2317
	4	624	2719		4	626	2756
	3	582	2771		Unk	571	1898
	4	634	3045		4	611	2322
	3	561	2796		4	627	3262
	4	652	3291		4	592	1798
Oct. 11	4	595	2196	Oct. 21	3	555	1766
	4	604	3257		4	575	2201
	4	631	2713		Unk	609	2427
	4	590	2364		4	585	2360
	4	642	2642		4	615	2902
	4	601	3226		3	568	1866
	4	616	3052				

AREA 25

Date	Age	Length	Fecundity
Oct. 3	3	515	2280
	3	525	2617
	Unk	580	2420
	Unk	550	2518
Oct. 8	4	570	2361
	4	580	2841
	3	570	2288
	3	530	2196
Oct. 11	4	585	2580
	3	540	2729
	3	615	2584
Oct. 18	4	580	2619
	3	540	2118
	4	550	1877
	3	540	2365
Oct. 19	3	560	2232
	4	565	2186
	Unk	535	2593
	4	570	3404
	4	580	2720
	3	540	2407
	4	550	2270
	4	585	2451
Oct. 20	3	510	2263
	3	570	2750
	4	500	2380
	4	580	3258
	3	570	2727
	3	550	2767
	Unk	560	2480
	4	540	2155
	4	560	2284
	3	535	2579
	4	530	2466
	4	610	2500
	3	560	3128
	4	550	1980
	3	530	1718
	3	565	1952
	Unk	545	2387

AREA 26

Date	Age	Length	Fecundity
Oct. 5	4	630	2461
	4	580	2424
	3	550	2731
	3	540	2170
Oct. 13	4	540	2716
	3	510	2716
	3	530	2308
	3	570	3202
	4	580	2677
	3	560	2619
	4	575	2243
Oct. 25	Unk	570	2532
	3	530	2482
	4	600	2918
	4	570	1941
	4	555	2263

Appendix Table10-4. Chum postorbital-hypural length and fecundity by age, Area 27, 1977.

AREA 27

Date	Age	Length	Fecundity	Date	Age	Length	Fecundity
Oct. 3	4	590	3181	Oct. 9	3	535	2788
	3	520	2296		4	460	2945
	3	530	3040		3	530	2939
	3	520	2726		3	530	2246
	4	535	1512		3	495	2456
	3	540	2587	Oct. 10	4	565	3247
Oct. 4	3	530	3246		3	530	2705
	3	520	2590		4	530	2363
	3	540	2593		Unk	550	2397
	4	575	2819		3	495	2434
	3	495	1651		Unk	560	2590
	3	520	2465		Unk	585	3108
	3	545	2758		4	565	2909
	4	560	2787		Unk	515	2664
	3	490	1879		Unk	520	2704
	3	520	2277		4	555	2327
Oct. 5	3	530	2538		3	525	2220
	4	530	2368	Oct. 16	3	510	2231
	4	585	2906		3	520	2533
	3	490	2157		3	510	2828
	3	520	2757		3	530	2440
	4	530	2769		4	540	3170
Oct. 6	4	555	2189		4	520	3165
	3	520	2324		Unk	510	1898
	3	500	2199		4	570	1793
Oct. 9	4	535	2751		3	520	2736
	3	555	2811		3	530	2774
	3	505	2666		4	540	3108
	4	550	3101		3	510	2894
	3	535	2666		3	540	3050
	3	550	2567		3	530	2320
	3	535	3419		4	570	4035
	4	615	2521		3	520	2501
	3	535	2809		4	530	2145
	3	510	2487		4	530	2467
	3	525	2855		3	530	2395
	4	545	2726		Unk	580	3415
	4	520	2430		3	520	2948
	3	530	2677		3	510	2766
	4	550	2514		4	540	2694
	3	560	2198		4	640	3153
	4	560	2918		4	580	3021
	4	550	2605				

Appendix Table 10-5. Linear regression analysis of chum fecundity (Y) on length (X) where y=bx+a, Areas 22-27, 1977 (n=sample size)[a].

Area	n	Mean female length (mm)[b]	Mean fecundity	Intercept (a)	Slope (b)	Correlation coefficient
22	23	584.1	2,615	92.99	4.32	0.354
23	70	601.8	2,563	-1,666.42	7.03	0.478[c]
24	79	597.0	2,599	44.22	4.28	0.265[c]
25	40	555.0	2,450	- 265.41	4.89	0.359[c]
26	16	561.9	2,511	2,065.32	0.79	0.075
27	85	535.6	2,645	- 196.24	5.31	0.363[c]

[a] Includes fish of unknown age.

[b] Postorbital-hypural.

[c] Significant at the 95% level of confidence.

POOR
QUALITY
ORIGINAL